

PSYCHOPHYSIOLOGICAL
STUDIES OF SLEEP AND DREAMING

by

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P R E F A C E.

The observation by Ramsey (1953), in his admirable review of studies on dreaming, that "The relatively small number of major research studies on dreams is surprising, since dreaming is such a universally experienced phenomenon and has through the centuries been of major interest to man . . . In the past, most of the studies on dreaming have been limited to case reports and speculations. While these have some value in themselves, they should lead eventually to more quantitative types of investigations. This goal, however, has not been served by most of the past studies", is to some extent still true at the present time. However, progress towards this goal was markedly accelerated with the publication by Aserinsky and Kleitman (1955a) of their observations of two types of ocular motility occurring during an electroencephalographic study of nocturnal sleep. There followed a series of publications by Kleitman and his associates in Chicago relating physiological variables measured during sleep with mental experiences reported by subjects following awakening. This series of studies aroused the interest of other groups working in the U.S.A., France, and here in Edinburgh, and provided the impetus to carry out the research embodied in this thesis.

The essential tool employed in these recent studies of sleep and those to be described in this thesis is the electroencephalograph. The electroencephalogram (EEG) of sleep will therefore be briefly described; and the work of Kleitman and his colleagues, and more recently of other groups, will be reviewed to form a general introduction to the experiments which follow and which will be described more or less historically, as they developed.

CHAPTER I.

INTRODUCTION.

What probing deep

Has ever solved the mystery of sleep?

(T. B. Aldrich, Human Ignorance.)

For a comprehensive review of work in the field of sleep and dreaming, see Oswald (1962a); for a concise review of the recent EEG and eye movement studies, see Kleitman (1961).

A. The EEG of Sleep.

The first major EEG study of sleep was carried out by Loomis et al. (1937). They proposed a five-stage classification A to E of different potential patterns of sleep which will be adopted in the present study, being the most widely used. The stages are characterised as they appear upon going to sleep.

Stage A. Corresponds to the state of drowsiness, characterised by presence of alpha rhythm, which waxes and wanes in amplitude, disappearing for a few seconds and reappearing in wave-trains of various lengths.

Stage B. Disappearance of alpha rhythm, leading to a rather flat trace with low voltage 3-6 c/s waves which increase in amplitude as C stage sleep is approached.

In non-alpha types, the transition from wakefulness to stage B is not easy to discern.

Stage C. The slow waves of stage B become greater in voltage and reduced in frequency, varying from 1-6 c/s. Stage C is particularly characterised by the appearance of sleep spindles of 12-15 c/s and evocation of the K complex (for a detailed analysis of the K complex, see Roth et al., 1956) by sensory stimuli.

Stage D. Spindles become superimposed on a background of slow waves of 1-2 c/s of high voltage, reaching 2-300 μ V.

Stage E. Spindles become less conspicuous and the record dominated by high voltage slow waves of 0.5-1 c/s. The separation between stages D and E is less easily defined than that between

other stages. Stage E, if reached during normal nocturnal sleep, only appears in the early part of the night.

B. The Cyclical Pattern of Night Sleep.

In early studies involving continuous EEG recording of nocturnal sleep (Loomis et al., 1937; Blake et al., 1939; Knott et al., 1939) are described the repeated fluctuation between different stages of sleep. Downward shifts between stages take place gradually and upward shifts tend to be abrupt, often accompanying a body movement or provoked by external stimulation. Johnson (1931) observed a wave-like variation in the frequency of body motility during nocturnal sleep; usually five well-defined waves or a dozen or more smaller ones.

Aserinsky and Kleitman (1955b) described hourly cycles of body and ocular motility and rest in infants during their first year of life. They also described in adult night sleep the cyclical recurrence of periods of rapid conjugate eye movements accompanied by increased body motility, heart rate and respiratory rate, and the low voltage EEG pattern of B stage sleep (Aserinsky and Kleitman, 1955a). Brooks et al. (1956) independently reported cyclical variations in the EEG pattern of all-night sleep recordings; periods of low voltage EEG sleep being concomitant with increased and irregular heart rate.

Dement and Kleitman (1957b) described the typical EEG sleep pattern derived from a series of nocturnal recordings of undisturbed sleep. Few marked departures from this general pattern have been observed throughout the course of the studies to be described in this thesis. There are usually 5 or 6 cycles in a night of 8 hours of sleep. The frequency of cycling varies from about 70 to 90 minutes, becoming faster towards the early hours

of the morning, when the duration of the emergent rapid eye movement and EEG low voltage periods also increase. The rapid eye movement and EEG low voltage periods occupy about 25 per cent of the total sleep duration. On the first downward swing of the first cycle following onset of sleep, the E stage does not always appear in some subjects or on all nights, and is not usually present in more than the first or second cycles. On the initial upward swing, the B stage with rapid eye movements only appears for a few minutes, if at all, and the rapid eye movement clusters are often interspersed with intervals of C stage sleep (but the EEG accompanying the rapid eye movements is always a low voltage, non-spindling trace).

C. The Rapid Eye Movement Periods and Dream Recall.

Aserinsky and Kleitman (1955a) noted increased facial movements and occasional vocalisation during the rapid eye movement and EEG low voltage sleep periods, which were suggestive of the subjects dreaming at these times. They found a high incidence of recall of dream content following awakening from rapid eye movement periods as opposed to a low incidence after awakening at other times. The concurrent appearance of a stage B low voltage EEG and rapid eye movements have been designated REM (rapid eye movement) periods, while stages C, D and E have been designated NREM (no rapid eye movement) periods. A large number of studies have been carried out investigating the relative frequency of dream recall following awakening from REM and NREM periods (Dement, 1955; Dement and Kleitman, 1957a and b; Dement and Wolpert, 1958; Wolpert and Trosman, 1958; Goodenough et al., 1959; Wolpert, 1960; Jouvet et al., 1960; Foulkes, 1960; Fischgold and Schwartz, 1961; Kremen, 1961; Kamiya, 1961; Rechtschaffen, 1961). All

investigations disclose a higher frequency of dream recall following awakenings from REM periods than from NREM periods; however, the figures quoted for the frequency of dream recall following awakenings from NREM periods vary considerably from study to study. Dement and Kleitman (1957a) after nearly 200 awakenings, reported 80 per cent recall from REM periods, compared with 7 per cent from NREM periods. Of the latter 7 per cent, the majority of instances of recall occurred when the awakenings followed cessation of rapid eye movements by less than 8 minutes, suggesting that such recall represented persisting memory of the dreams related to the preceding REM periods, rather than dreaming during the periods of ocular quiescence. This conclusion was supported by Wolpert and Trosman (1958), who found that dream recall declined rapidly as the time of awakening increased from 5 to 10 minutes after cessation of the previous eye movement period. Variations in frequency of NREM recall are probably a result of differences in criteria of recall, subjects studied, experimental procedures employed (particularly questioning technique), period elapsing between cessation of the rapid eye movement period and awakening, and vagaries of chance. Kremen (1961), who appears to have carried out the most rigorous study, obtained incidences of positive dream report of 75 per cent and 12 per cent for the REM and NREM conditions respectively.

Goodenough et al. (1959) investigated the sleep characteristics of those who claimed to dream regularly and those who claimed to dream rarely or never, which were classified as dreamer and non-dreamer groups respectively. "Eye movement periods occurred as frequently for non-dreamers as for dreamers". Non-dreamers were less likely to recall a dream than dreamers, but every subject

reported dreams during the study. Differences which did exist were explained by the fact that most or all of the rapid eye movements for many of the non-dreamers were accompanied by a greater amount of alpha rhythm than for the dreamers, the non-dreamers would frequently claim they had been "awake and thinking" when awakened from a REM period, mainly because their dreams were less bizarre and more like their waking thoughts than those of the dreamers. Goodenough et al., (1962) have since been unable to confirm these differences. They find that "individual differences in alpha and body movement activity during REM periods are probably not very useful measures of sleep depth", these variables not being significantly related to each other or to arousal thresholds; "there is no evidence that the subjects are awake or even in a lighter sleep during REM periods which yield a report of 'thinking' rather than dreaming". Antrobus (1962) has found that dream recallers spend more time in stage B with rapid eye movements than non-recallers. It has been claimed that dreaming is diminished or abolished following leucotomy (Partridge, 1950) but a normal cyclical sleep pattern with REM periods was observed in a patient four weeks after pre-frontal leucotomy (see Appendix C).

The findings that a dream is frequently recalled following awakening from a REM period and only rarely following awakening from a NREM period is consistent with the proposition that dreams are occurring during REM periods, but is not synonymous with this proposition (Malcolm, 1959). Judgement of whether the sleeper has been dreaming is dependent upon his verbal report after awakening, and there is no proof that dreaming does not occur continuously throughout all stages of sleep. This should continually be borne

in mind in relation to any identification of the sleeper recalling a dream with his having been dreaming, which, for the sake of brevity, is common practice. It is a workable hypothesis to consider (as Dement and Kleitman, 1957b, do) a low voltage, stage B, non-spindling EEG a better criterion of the presence or absence of dreaming than rapid eye movements, but this hypothesis can never be verified, only supported, by a positive dream report following awakening of a subject exhibiting such an EEG trace with absence of eye movement.

D. The Sleep of Animals.

Comparative studies of cats during sleep have revealed similar cyclical patterns (Dement, 1958; Jouvet et al., 1960). Short periods of low voltage, fast EEG patterns repeatedly alternate with periods of slow waves and spindles. During the latter phase, fast waves as recorded by implanted electrodes are present in the hippocampus and mid-brain. But during the phase of low voltage, fast EEG activity, which is similar to wakefulness, slow synchronised rhythms are present in the hippocampus and slow waves and spindles in the hind-brain. This "activated" (Dement, 1958) phase in which the hind-brain appears "asleep" and the fore-brain "awake" has been called the "paradoxical phase" by Jouvet et al., (1959), and more recently, "hind-brain" sleep (Jouvet, 1962). Associated with this phase is a very marked decrease in muscle tone (Jouvet et al., 1959; Karmos and Grastyán, 1960); shallower, faster, irregular respiration with irregular heart rate (Jouvet, 1961); bilateral eye movements (Dement, 1958; Jouvet et al., 1960); and a 10-30 per cent decrease in blood pressure (Rossi et al., 1961). The last, however, has not been confirmed in man (Snyder, 1962).

Recurring periods of low voltage, fast activity with rapid eye movements, have also been described in the monkey (Weitzmann, 1961); the rabbit (Faure, 1962); and the rat (Jouvet et al., 1962).

E. The Present Studies.

The investigations and experiments to be described in the following Chapters are concerned with further examination of the cyclical pattern of nocturnal sleep in normal and abnormal states, and the application of physiological measurements during sleep to the study and experimental modification of the dreaming process.

More specifically, the following aspects were investigated:-

1. The electromyographic activity of the vocal musculature.
2. The nature of the rapid eye movements.
3. The pattern of sleep in patients suffering from melancholia.
4. Experimental modification of the sleep pattern following
 - (a) ingestion of barbiturates.
 - (b) sleep deprivation.
5. The effect of meaningful, verbal stimuli during dreaming on the content of subsequent dream reports.

Each study will be introduced by a review of related work. This may involve some repetition since some of the studies are incorporated in this thesis in the form of publications in which the Introductions tend to be rather brief.

CHAPTER II.

THE ELECTROMYOGRAPHIC ACTIVITY OF THE
VOCAL MUSCULATURE.

limb-relaxing sleep, that loosens the cares
of the heart.

(Homer, Odyssey, Bk. XX. 1. 56.)

A. INTRODUCTION.

The investigations described in this Chapter were initially designed in order to test the prediction that activity of the vocal musculature during REM periods would be associated with dreams in which words were 'spoken' by the dreamer. This prediction could not be tested owing to unanticipated technical difficulties which soon became apparent. However, unexpected observations concerning the behaviour of the laryngeal muscles were made and will be described as they occurred during the preliminary investigations attempting to establish the initial prediction.

Motor Activity during Sleep.

It has been proposed (Dement and Kleitman, 1957a; Dement and Wolpert, 1958) that the rapid eye movements associated with dreaming bear a direct relationship to the content of the dream, that they are scanning movements of the eyes of the dreamer as he "watches" his dream images. This hypothesis will be more fully discussed in Chapter III.

Numerous small peripheral movements during REM periods were noted in humans by Dement and Kleitman (1957b); and many twitching movements of the limbs, vibrissae and ears of cats during the "paradoxical phase" were described by Dement (1958), in spite of the fact that the neck muscles are more relaxed during this phase than during the phase of slow waves and spindles (Jouvet et al., 1959); the latter being associated with immobility (Dement, 1958).

Observations by Wolpert (1960) of isolated electromyographic activity from the limbs appeared to correlate with the action of

the dream as reported by the sleeper following deliberate awakening. Gross body movements occasionally appeared related to dream content, but more often mark the end of one dream sequence and the beginning of the next (Dement and Wolpert, 1958). Max (1935) observed occasional prolonged bursts of activity continuing for 2½ minutes or more in the hand and finger muscles of deaf-mutes, during sleep, of which no instance was reported in normal subjects. Following 91 per cent of awakenings during such bursts, a dream was reported, compared with 16 per cent following awakenings during quiescent periods.

Motor Activity and Wakeful thinking.

Activity appeared in the hand and finger musculature of deaf-mutes to a greater extent than in normals, when given abstract problems to solve during wakefulness (Max, 1937). Earlier studies attempting to measure motor activity accompanying thought, following the proposition by Watson (1914) that "thought was implicit speech", depended upon the use of relatively crude mechanical devices (e.g. Thorson, 1925). Jacobson (1932) used electrophysiological techniques in subjects previously trained in progressive relaxation of peripheral musculature so that resting tonus was minimised. When subjects imagined themselves performing various visual, verbal or manual acts, increased action potentials were recorded in the eye, vocal and limb musculature respectively.

The Activity of the Vocal Apparatus and Auditory Hallucinations.

Gould (1948) described observations of an abnormally high level of electrical activity of the vocal musculature of psychotic patients experiencing auditory hallucinations which he considered

to be a manifestation of automatic sub-vocal speech. In further investigations (Gould, 1949; 1950), by auscultation over the larynx, Gould reported amplification of sub-vocal speech sounds to an audible level coincident with the report of auditory hallucinations. These observations, however, were not confirmed by Roberts et al., (1951), who found 43 reports of auditory hallucinations to be accompanied by 19 instances of muscle activity of a moderate or marked degree. Of these, only 4 instances of increased activity were coincident with the report of an auditory hallucination.

B. THE INITIAL HYPOTHESIS.

Bearing in mind the above studies, particularly those of Gould, and the often oneiric quality of psychotic thought (Oswald, 1962a), it was decided to carry out an electromyographic investigation of the muscular activity of the vocal apparatus in order to test the hypothesis that dreams reported by the sleeper following awakening from a REM period in which the sleeper claimed to have spoken, would be associated with increased activity of the vocal musculature during that REM period.

C. THE PRELIMINARY INVESTIGATIONS.

Some initial all-night EEG and eye movement recordings of natural sleep were taken. The electromyograms were recorded from surface electrodes $1\frac{1}{2}$ inches either side of the larynx. However, the record was unintelligible owing to the frequent changes in position of the head and neck, causing large variations in the resting muscle tonus (the major proportion of electromyographic activity being picked up from the neck muscles). Measurement of

activity from a vocal muscle group, whose resting tonus does not alter considerably with change in body position, was necessitated. Draper et al., (1960) found (using needle electrodes) that audible vocalisation was accompanied by activity of the intercostal muscle group. Since these muscles are relatively isolated from the other muscle groups, and their resting tonus not altered drastically by changes in body position, it was decided to attempt to measure their activity during sleep. It was found that the resting tonus decreased to such a low level on falling asleep that there was no discernible variation in action potentials throughout sleep other than that caused by a body movement (which generally caused muscle artefact to appear simultaneously in the EEG and eye leads). Attention was therefore reverted to the laryngeal muscle group; this time in the region of the throat, which is less affected by tension of the neck than either side of the larynx.

Continuous nocturnal sleep recordings were taken with electrodes placed over the supra- and infrahyoid muscles. An unexpected decrease in electromyographic activity was observed at the onset of each REM period. It was decided to study systematically this variation, which forms the basis of the publication ("Tonus of Extrinsic Laryngeal Muscles during Sleep and Dreaming") which follows.

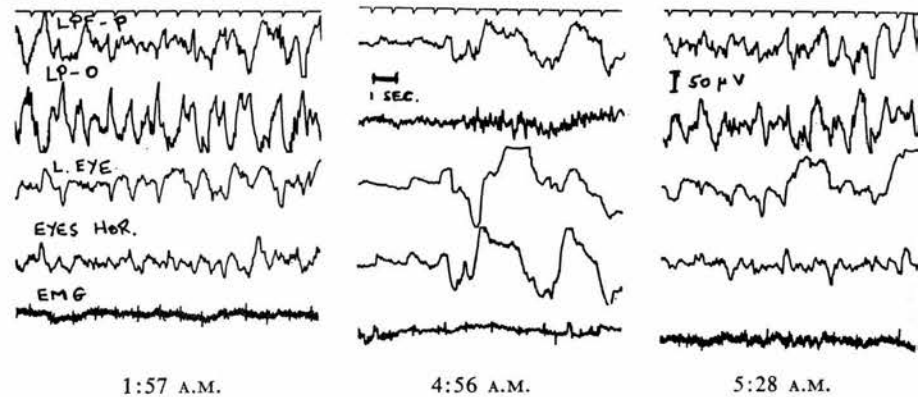


Fig. 1. Variation in laryngeal resting potential with depth of sleep. The EMG activity recorded during ocular quiescent deep sleep phases at 1:57 A.M. and 5:28 A.M. is markedly greater than that recorded at 4:56 A.M. during the intermediate dream period of light EEG sleep, with rapid eye movements clearly seen in the eye channels.

jects for a total of 17 nights of continuous sleep.

The electroencephalogram was recorded by means of an anteroposterior chain of electrodes affixed to the scalp with collodion. Eye movements in the horizontal plane were recorded by the electro-oculogram, by a central forehead electrode and a lateral pair made up of an electrode at each outer canthus, attached to the surface of the skin by means of sticking plaster.

Electrical activity in the laryngeal musculature was monitored by surface electrodes attached to the skin with sticking plaster over the supra- and infrahyoid muscles.

When the subjects fell asleep there was invariably a continual, discrete decrease in the EMG activity, until the appearance of sleep spindles and K-complexes. The EMG activity then tended to remain constant, apart from momentary increases associated with gross body movements, swallowing, or localized movements. These could be identified by means of a sensitive microphone at the head of the bed and by muscle artifact in the EEG and eye leads.

The depth of sleep, as indicated by the EEG, showed the typical cyclical pattern (3), with rapid eye movements occurring during the light phases of "A" and "B" stage sleep.

A rapid decrease in EMG activity was invariably observed, with the disappearance of sleep spindles, on the upswing of a sleep cycle from the "D" and "E" stages of deep sleep, through the "C" stage to the "A" and "B" stages, accompanied by rapid eye movements normally associated with dreaming. An example of this variation in EMG activity is shown in Fig. 1.

Jouvet *et al.* (4) have noted a similar

variation of EMG activity in the nuchal muscles of cats during sleep. After a "slow" stage of sleep characterized by spindles and slow waves, there was a "rapid" sleep phase: the "paradoxical phase" which was characterized by a rapid, low-voltage, nonspindling electroencephalogram similar to that of wakefulness, accompanied by rapid eye movements and total disappearance of EMG activity. This phase is identified by Jouvet (in 5, p. 204) with the "A" and "B" sleep stages, rapid eye movements, and dreaming in humans. This view has been contested by Schwartz and Fischgold (in 5, pp. 225, 232), who maintain that there is an increase in oropharyngeal muscle tone with eye movements, on the grounds that snoring occurs extremely rarely during rapid eye movement periods, snoring being attributed to the loss of muscle tone in the soft palate.

It therefore appears from the present study either that the "A" and "B" sleep stages in humans are equivalent to Jouvet's "paradoxical phase" of "rhombencephalic sleep," or that the observed variation of muscle tonus during sleep is peculiar to the laryngeal muscles.

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7 July 1961

D. Tonus of Extrinsic Laryngeal Muscles during Sleep and Dreaming

Abstract. The tonus of extrinsic laryngeal muscles was studied in sleeping humans by means of electromyograms. A striking decrease in the muscle tonus was observed at the onset of each phase of electroencephalographic light sleep, rapid eye movements, and dreaming.

Previous electromyographic (EMG) studies of muscle tonus during sleep in humans have found the resting potential to decrease when the subjects fall asleep, but no relationship was found between resting potential and the depth of sleep determined from the electroencephalograph (EEG) (1).

The aim of the present study was to investigate the high resting tonus of the laryngeal muscles during continuous sleep. Brain waves, eye movements, and electromyograms were recorded, by essentially the same procedure as that of Dement and Kleitman (2), in nine sub-

E. FURTHER COMMENTS ON THE INVESTIGATION OF THE
TONUS OF EXTRINSIC LARYNGEAL MUSCLES DURING
SLEEP AND DREAMING.

Figure I shows more clearly the decrease in laryngeal resting potential at the onset of a REM period, and also during wakefulness (top photograph). It should be noted that the initial marked decrease in electromyographic activity precedes the change in the EEG pattern and the onset of rapid eye movements by one minute; this is compatible with similar observations by Lissák et al., (1961) in cats. It appears that a neurophysiological change occurs in the hind-brain prior to any change in the electrical activity of the cortex.

Dement and Kleitman (1957b) found that auditory thresholds were greatly elevated during REM periods compared with stage B periods occurring on falling asleep in transition from A stage to C stage sleep. Recent observations by Hawkins et al., (1962) of increased basal skin resistance during REM periods also indicate this phase to be one of decreased "arousal" (basal skin resistance being inversely related to level of arousal (Silverman et al., 1959)). Although auditory thresholds in humans have been reported to increase progressively from the A stage through stages B, C and D to E stage sleep, (Coleman et al., 1959; Fischgold and Schwartz, 1961; Zung and Wilson, 1961), observations during the "paradoxical phase" in cats, of elevated auditory thresholds (Dement, 1958); of raised threshold to stimulation of the reticular formation (Benoit and Bloch, 1960); Jouvét et al., 1960), and behavioural arousal with concurrent appearance of EEG slow waves to reticular formation stimulation

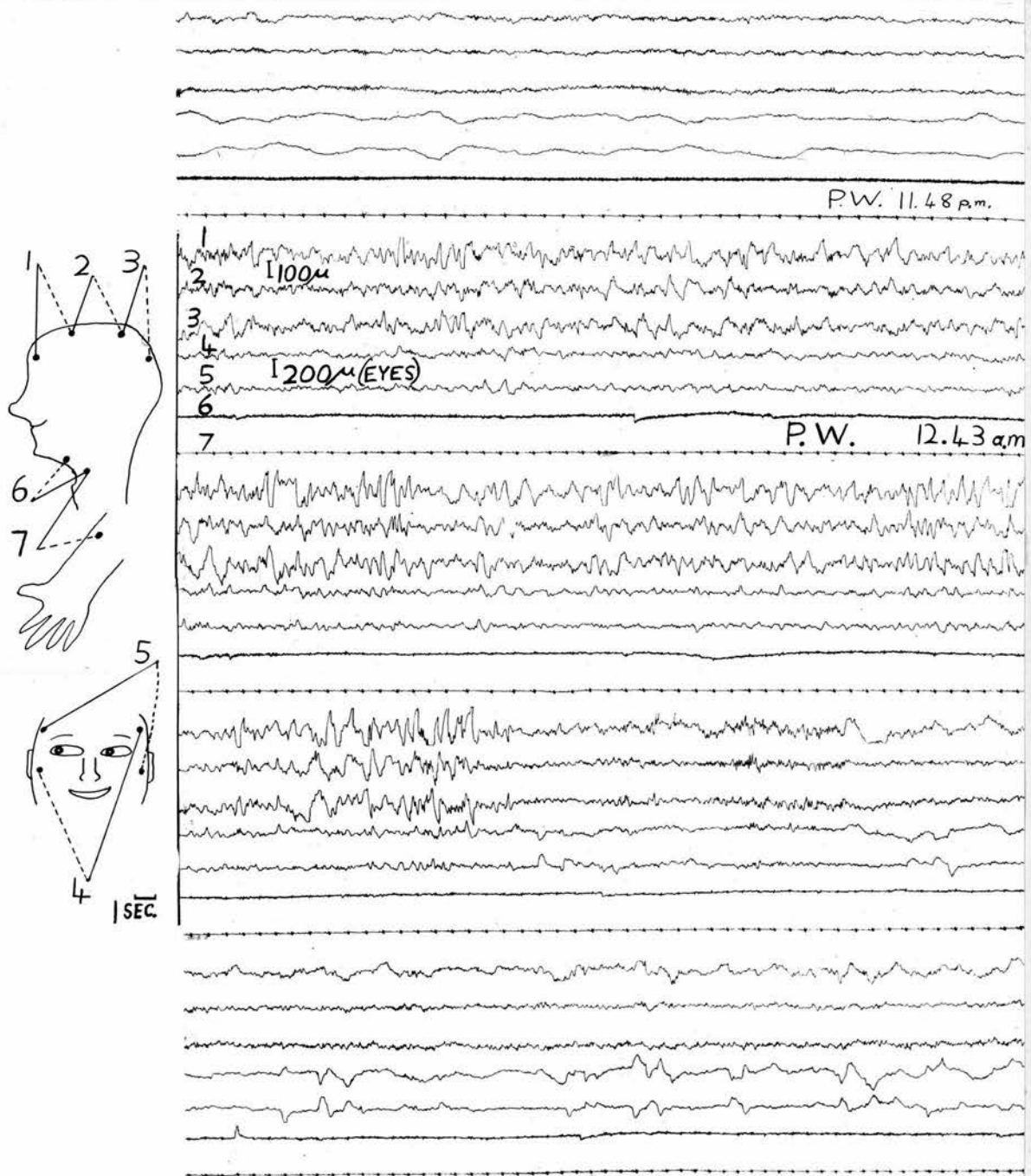


Figure 1.

Decrease in laryngeal resting potential prior to the onset of a REM period. The uppermost excerpt shows the high resting tonus during drowsiness (note the waxing and waning of alpha rhythm and rolling eye movements). The lower four sections are continuous. In the third section can be seen the sudden decline in resting potential during EEG D-stage sleep one minute prior to the marked change in the EEG pattern, appearance of rapid eye movements and acceleration of heart rate, seen in the fourth and fifth sections.

(Horovitz and Chow, 1961); indicate the "paradoxical phase" to be deeper in these respects than the phase of EEG slow waves.

The evidence suggests that the REM periods can no longer be considered in the traditional sense as light sleep associated with an activated EEG pattern, but represents a neurophysiologically unique phase of sleep, similar to the "paradoxical phase" of sleep in the cat.

The 'depth' of sleep in relation to the categorisation of distinct stages of sleep will be considered further in Chapters IV and V.

CHAPTER III.

THE NATURE OF THE RAPID EYE

MOVEMENTS.

O sleep! in pity thou art made
A double boon to such as we;
Beneath closed lids and folds of deepest shade,
We think we see.

(Nathaniel Frothingham, The Sight of
the Blind.)

A. The Rapid Eye Movements and Dream Imagery.

The rapid, binocularly synchronous eye movements which recur throughout the night in conjunction with the emergent periods of EEG B stage sleep are distinct from the slow, drifting, sometimes non-conjugate movements of the eyes (similar to those commonly observed during anaesthesia) which were found to be prominent during relaxation at the onset of sleep and following overt body movements throughout sleep (Aserinsky and Kleitman, 1955a). Rapid eye movements are invariably absent during the initial B stage EEG of drowsiness at the onset of sleep; and subjects when awakened from this stage reported hypnagogic hallucinations which were "dream-like" but distinctly different from a dream (Dement and Kleitman, 1957b). Subjects denied having been asleep and did not consider their mental imagery to have been "real" as in dreams, being passive experiences involving no active participation of themselves. Awakenings later in the night from REM periods generally elicited dream recall and the impression of having been "really asleep". However, these differences in recall were not wholly confirmed by Goodenough et al., (1959), who collected a large number of dream reports following awakening from REM periods which they considered to be indistinguishable from hypnagogic reveries; some subjects frequently claiming to have been lying awake and "thinking" (see Chapter I).

The similarity between the rapid eye movements associated with dreaming and the directional, voluntary eye movements of wakefulness suggested to Kleitman and his colleagues that the rapid eye movements might represent scanning movements of the eyes as the dreamer "watches" the visual events of his dream,

and that they might be related to the recalled dream content following awakening from the REM period. Dement and Wolpert (1958), in support of this hypothesis, reported a significant correlation between the amount of eye movement in the EEG recordings and the amount of activity involved in the dream reports. Large amounts of rapid eye movement were associated with "active" dreams in which the dreamer was an active participator in the dream, minimal eye movements in the recording were associated with "passive" dreams in which the dreamer was quietly reflecting upon an event, or watching an event occur, often from a distance, in which he took no active part. Dement and Wolpert also found a significant correlation between the last action reported by the dreamer and the direction of the last eye movement prior to awakening. As has been pointed out by Oswald (1962a), the above study lacked certain methodological controls, especially in that the judgements were not made by persons totally unfamiliar with the EEG recordings and dreams in question. Further, Dement (1955) had earlier described the dream reports of schizophrenic patients as more passive than those of control subjects. The dreams of schizophrenics were frequently devoid of action, often involving nothing more than observations of "isolated, inanimate objects apparently hanging in space". However, the frequency of rapid eye movements did not differ between schizophrenics and controls. Dement considered this lack of correlation between dream activity and eye movements to be due to unreliability of the patients' reports. But, as Oswald (1962a) has pointed out, such passive dreams probably reflected the normal waking life of chronic, institutionalised schizophrenics.

The opportunity was taken incidentally to the main purpose of a later study (Chapter VII) of independently repeating the "active"/"passive" eye movement study of Dement and Wolpert (1958) and it was also decided to employ a different approach to the problem, not involving direct examination of the direction of the eye movements from the electrical record, and comparison with those which might be expected to be executed in the scanning of dream imagery.

An account of these investigations is given in the publications, "Eye Movements during Active and Passive Dreams" and "The EEG, Eye-Movements and Dreams of the Blind", which follow.

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B. Eye Movements during Active and Passive Dreams

Abstract. Independent confirmation is offered that the amount of rapid eye movement during dreaming is associated with the dream content.

It is now recognized that there exist two different and alternating categories of sleep. One has been called "hind-brain sleep" by Jouvet (1) and is accompanied by a low-voltage and fairly fast electroencephalographic (EEG) pattern, relaxation of certain neck muscles in cat (1) and human (2) and, perhaps most strikingly, by bursts of conjugate, rapid eye movements with subsequent recall by the subject that he has dreamed (3). Dement and Wolpert (4) reported evidence supporting their hypothesis that these eye movements were directional responses to the events of the dream. Yet rapid eye movements persist in cats after decortication (1). Also the fact that characteristic saw-toothed electroencephalographic waves tend to precede each burst of rapid eye movements appeared to us to cast doubt on the hypothesis: the presence or absence of these eye movements during "hind-brain sleep" of blind men, according to the retention or absence, respectively, of visual imagery (5), would support the hypothesis. One of us (6) has criticized Dement and Wolpert's report but is now pleased to report confirmation of one of their findings, namely a relation

between profuse eye activity and an active dream fantasy.

One of us (R.J.B.), for an entirely distinct purpose, awakened eight volunteers from periods of rapid eye movement on 103 occasions during 37 nights. Dream recall occurred in 89 instances and was recorded on magnetic tape. The dream reports were subsequently all presented to the other of us (I.O.), who had never been present during the nocturnal recording sessions and who had never seen the relevant electroencephalographic or eye movement records. He classified the dream reports as "active" or "passive" according to the nature of the events described, and especially if he felt such events would have been accompanied by many shifts of gaze, had they occurred in real life.

Subsequently R.J.B. assigned code numbers to each electroencephalographic and eye movement record and presented each to I.O., who was entirely ignorant of the dream to which each record was related and distinctly skeptical of the likelihood of the association eventually found. The eye movement periods were classified by I.O. as "active" or "passive" according to the frequency and size of the eye movements which occurred throughout each 10 to 20 minute period prior to the time the subjects had been awakened, although the later in the period the movements did or did not occur, the greater the

weight he attached. The whole set of records was then inspected again in a different order by I.O. and classified a second time. R.J.B. then selected the records of the 22 instances where divergent judgments had been made, and I.O. made a final classification of these periods of rapid eye movement.

The code was then broken. Fifty dream reports had been classified as "active" and in 42 instances the relevant period of rapid eye movement had been judged "active." Thirty-nine reports had been classified as "passive" and in 23 instances the relevant period was judged "passive."

It is therefore confirmed that there is a significant association ($\chi^2 = 16.18$; $P < .001$) between the nature of the dream content and the amount of movement of the eyes.

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**THE EEG, EYE-MOVEMENTS AND DREAMS OF THE
BLIND**

BY

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It was found that characteristic frontal EEG waves significantly often precede the rapid eye movements of dreaming. The rapid eye movements were absent during dream periods of three men with life-long blindness, and of two men, 30 and 40 years blind respectively, but were present during dream periods in three men blind only 3, 10 and 15 years respectively.

INTRODUCTION

In recent years, numerous American and French workers have described the invariable cyclical appearance, during continuous nocturnal sleep, of light sleep patterns in the electroencephalogram (EEG), accompanied by frequent and characteristic clusters of rapid conjugate eye movements (REMs) and dreaming (e.g. Dement and Kleitman, 1957*a* and *b*). The REMs have been claimed to represent scanning movements with respect to the dream visual imagery (Dement and Kleitman, 1957*b*). The "REM periods" with accompanying EEG picture vary in duration (20 min. is common) and four to six occur per night, together with characteristic muscle tonus changes (Berger, 1961).

Schwartz and Fischgold (1960) and Jouvet, Michel and Mounier (1960) described brief appearances of 2 to 3 c./sec. frontal EEG activity, having a characteristic "saw-toothed" wave form associated with the REMS.

We decided to investigate the hypothesis of the American workers that the REMs represent what may be called "looking-at-dream-picture" movements. First, by a closer examination of the time relations between the "saw-toothed" frontal EEG activity and the onset of individual REM clusters; secondly, by studies of the EEG and eye movements during nocturnal sleep in the blind.

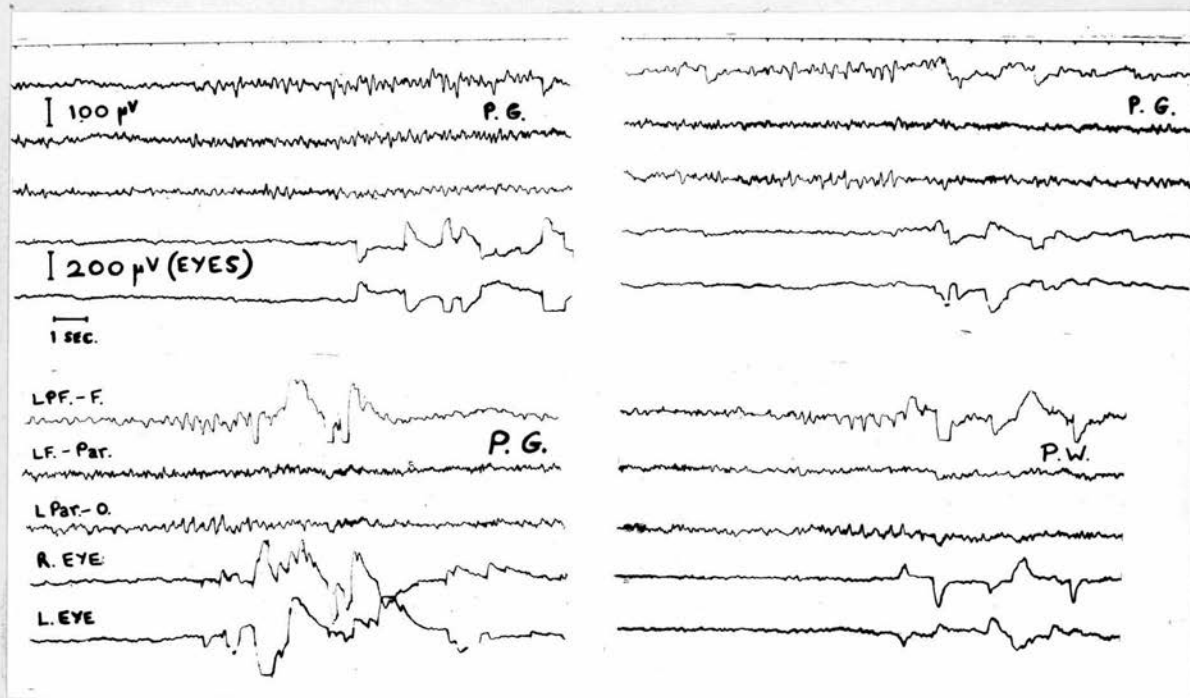
Jastrow (quoted by Ramsay, 1953) studied the dream reports of persons who had become blind at varying periods after birth. Those who became blind later than early childhood maintained visual imagery but there was a progressive decline of reports of visual imagery as the individual became older. A few individuals only were said still to report some visual imagery after 40 years of blindness.

METHOD AND RESULTS

The EEG "saw-toothed" waves

In the course of other studies of all-night sleep we observed that among 36 normal persons, on whom suitably located electrodes had been used, were 23 who showed the 3 c./sec. frontal "saw-toothed" waves very prominently. It seemed clear to us that generally these brief bursts of EEG waves *preceded* individual REM clusters. In order to confirm this hypothesis, we recalled the first of our subjects from whom we had recorded the saw-toothed waves, and recorded one further entire night's sleep. The EEG was recorded using a left antero-posterior chain of silver cup electrodes, and eye movements by means of the most anterior EEG electrode and two other electrodes fixed just below the outer canthus of each eye. The diagonal and asymmetrical electrode placement had the advantage of economy, and allowed

Figure I b.

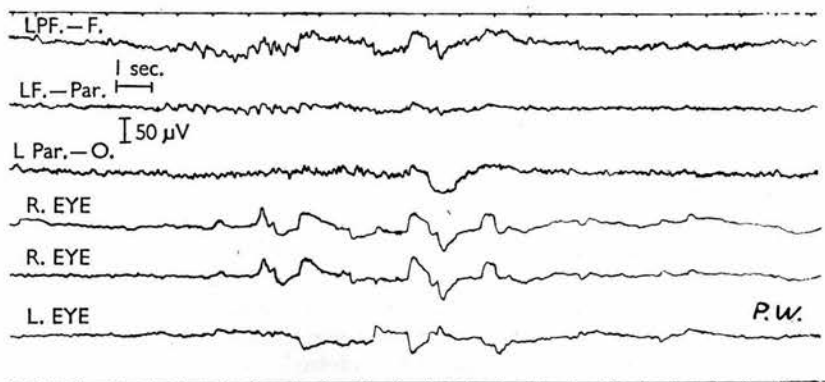


Further examples of "sawtoothed" frontal activity preceding rapid eye movement clusters.

both horizontal and vertical REMs to be recorded on the same channels. Figure 1 illustrates.

Subsequently, with the eye movement channels and then the EEG channels of the record alternately obscured, two of us (I.O. and R.J.B. respectively) independently marked the record where it was judged that each "saw-toothed" burst and each REM cluster began and ended. Figure 2 indicates that our hypothesis was confirmed;

FIGURE 1a.



An example of "saw-toothed" frontal activity preceding the appearance of a brief REM cluster by 3 sec.

LPF—F = left pre-frontal—frontal.
 LF—Par. = left fronto—parietal.
 L Par—O = left parieto—occipital.

the onset of "saw-toothed" frontal EEG waves is significantly ($\chi^2 = 229.4$, $n = 2$, $p < 0.001$) related to the five seconds preceding a REM cluster. This result was obtained by comparing the observed frequencies with those which would be expected to occur by chance, the latter being proportional to the total duration of each condition.

Blind subjects

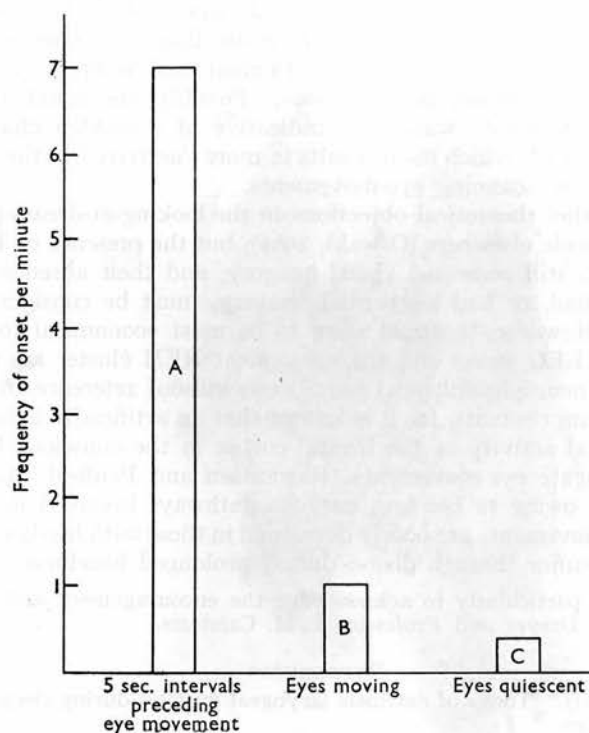
An antero-posterior chain of silver cup electrodes was used to record the EEG. A pair of electrodes was fixed at each outer canthus, to give four different electrode combinations, to enable us to recognize the occasional electrode artefact (these sometimes look like REM potentials). Eight blind male adults were studied, each having two entire nights of recording.

Three men had had life-long blindness; two, aged 25 and 30, on account of severe corneal scarring (probably resulting from neonatal gonorrhoea) and one aged 17, on account of bilateral optic atrophy since the age of 18 months or earlier. These men had no conception of visual imagery. A 60-year-old man had been blind for 30 years owing to corneal scarring, and a 52-year-old man for 40 years owing to traumatic retinal detachment and cataracts. The latter two men both stated that they had lost the ability to picture things and claimed that no visual imagery was present in their dreams. Each was first shown to produce clear electro-oculographic potentials when the eyeballs were moved voluntarily. None of these six men had REMs in their cyclically recurring light sleep periods, during which, to

judge by their subsequent reports, they nevertheless dreamed of non-visual fantasy experiences.

Three men aged 23, 33 and 40, totally blind for 10, 3 and 15 years respectively claimed still to experience visual imagery. Each had REMs in their cyclically recurring light sleep periods differing in no way from those of normal sighted people, and each when wakened during REM periods recalled visual dreams. As an illus-

FIGURE 2



Frequencies of occurrence per minute of the "saw-toothed" activity during 5-sec. intervals preceding REM clusters, during REM clusters, and when the eyes are quiescent during the cyclically recurring light sleep periods.

- A: 28 instances of onset of saw-toothed activity in a total of 4 min. (namely, 5-sec. periods preceding a total of 48 REM clusters).
- B: 20 instances of onset of saw-toothed activity during the course of the 48 REM clusters of total duration 20 min.
- C: 21 instances of onset of saw-toothed activity during a total of 72 min. while the eyes were quiescent during REM periods.

tration, the man who had been blind for 15 years (who had particularly active REMs) described how he dreamed he was in the swimming bath, how he did the "crawl" rapidly to the other end where he could see his friend's wife ("her white skin and black costume, it was all very vivid") and splashed water teasingly over her. Of the eight blind men, only this last man had "saw-toothed" waves.

DISCUSSION

Wolpert (1960) implies a theory of peripheral control of dreaming in the statement: "Thus REMs appear to be specific to the manifest dream content, thereby confirming the suggestion put forward by Ladd as early as 1892 that during dreaming the eyeballs move gently in their sockets, taking various positions induced by the retinal phantasms as they control the dream."

A peripheral theory of this nature does not commend itself to us and we find it difficult to reconcile our observations concerning the "saw-toothed" EEG waves with a looking-at-the-dream-pictures hypothesis. It could perhaps be argued that dreaming occurs in a series of short flashes: the frontal activity being a physiological concomitant of the commencement of each dream flash, the fantasied contents of which provoke scanning eye-movements. Dement and Wolpert (1958), however, argue strongly that dreaming is continuous. Possibly one could argue that the frontal EEG "saw-toothed" waves are indicative of a sudden change of neurophysiological status quo, which itself results in more "activity" in the dream events, so calling forth more scanning eye-movements.

A number of other theoretical objections to the looking-at-dream-pictures hypothesis have been made elsewhere (Oswald, 1962), but the presence of REMs in those blind subjects who still possessed visual imagery, and their absence in those who had either never had, or had lost visual imagery, must be considered to support the hypothesis. However, it would seem to us most economical to suppose that both the burst of EEG waves and the subsequent REM cluster are indicative of a sudden change of neurophysiological conditions, without reference to awareness of, or response to dream contents, for it is known that an artificially induced change of electro-physiological activity of the frontal cortex in the conscious human can be followed by conjugate eye-movements (Rasmussen and Penfield, 1948). It could be supposed that, owing to non-use, nervous pathways involved in the execution of conjugate eye-movements are poorly developed in those with life-long blindness, or, once established, suffer through disuse during prolonged blindness.

We should like particularly to acknowledge the encouragement and facilities given us by Professor J. Drever and Professor G. M. Carstairs.

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C. Further Comments on Dreams of the Blind.

The validity of statements concerning the visual imagery of blind persons might be questioned. This has always been a controversial point, but one must ultimately rely upon introspective reports by the persons themselves. However, it is often possible to infer whether visual imagery was present in a dream, or not, from the mode of description of the dream. Dreams obtained from the blind subjects, by awakening them from REM periods, or emergent periods of EEG B stage sleep, were consistent with their previous statements regarding their visual imagery. Some additional examples are given here to bear out this point.

Of the three men who had life-long blindness, the 30-year-old man, when awakened from a period of emergent B stage sleep, (no rapid eye movements being present in the record) described how he had been to a jazz concert with his friends, to whom he was talking; and the 25-year-old man described how he was in the Blind Workshop, where he had just been given a broken rosary, which he was probably about to put inside a football so that the movement of the latter could be followed by a sightless person (both quoted by Oswald, 1962a). In both these dream descriptions, no intimation was given of any visual elements being present.

The 23-year-old man, totally blind for 10 years, claimed to experience both visual and non-visual dreams. During our observations on this subject, an example of each was obtained. When awakened from a REM period (which had been interrupted by a few minutes of C stage sleep, before continuing for several more minutes) he recalled two dreams, the first non-visual; the second visual. He described how, in the non-visual dream, he was sent

for following an examination during the marking of the papers because he had made a mess of a word in the Braille script. He was asked to explain the word, and he stood next to the examiner feeling it plainly with his fingers while telling the examiner what it represented.

The description of the visual dream is given here verbatim (E refers to the experimenter; S to the blind subject).

E. What have you been dreaming about?

S. . . Oh, yes. There were two girls washing dishes in this room, they were twins, because I could see them. There were some other people in the room, I couldn't see them, but I could sense their presence. There was a sink at the end of the bed.

E. Could you see it?

S. . . Yes, the twins were washing the dishes there. I was certainly dreaming. . . I now realise the difference between blind dreams and visual dreams. In blind dreams, I'm treated as though I were blind. In the dishwashing dream, I was wondering what they (the twins) would say when they saw me.

E. Were they talking?

S. I think they were possibly talking, but I certainly didn't speak to them since I was wondering what they would say when they saw me.

This subject had REM periods identical to those of normal, sighted subjects, yet claimed to have both visual and non-visual dreams. If the hypothesis that the rapid eye movements represent scanning movements is correct, this subject would be expected

consistently to recall visual dreams. That he did not, might be explained by his failure to recall visual elements, possibly because they were not sufficiently striking to him. It is known that sighted persons claim not to experience dreams in colour, but (as will be described in Chapter VII) following experimental awakening from REM periods, frequently report colour dreams (the frequency of these dreams is probably underestimated). However, as has been proposed above, non-use of nervous pathways owing to prolonged blindness may lead to their degeneration and the gradual disappearance of rapid eye movements during the recurrent periods of B stage sleep; and this process might take place at a slower rate than the decline in ability to "picture" things visually.

D. Further Considerations of the Relationship between the Rapid Eye Movements and Dream Imagery.

The results of the present study tend to support the hypothesis that the rapid eye movements are directional responses to the dream imagery, but these results are not dependent upon the validity of such a hypothesis. An alternative interpretation of the observations on the blind subjects has already been offered and although an association between the amount of eye movement and dream activity appears to have been established, such an association does not require any correlation between the direction of the eye movements and events of the dream.

The appearance of rapid eye movements during emergent EEG B stage periods of sleep in decorticate humans suffering from white matter degeneration in the neocortex (Jouvet et al., 1961), and during the "paradoxical phase" in cats deprived of their

neocortex (Jouvet et al., 1960), is contrary to a scanning hypothesis of dream imagery. One may reasonably exclude the possibility of decorticate humans and cats retaining any dream imagery (although it is possible that, in the case of the humans, there remained parts of cortex which were still functional). Further studies by Jouvet et al., (1962) of humans suffering from diffuse injury to the neocortex have shown the persistence of the "paradoxical phase" accompanied by rapid eye movements, during sleep, of such patients (Jouvet and his colleagues identify the emergent periods of B stage sleep in humans with the "paradoxical phase" in cats).

Rapid eye movements have recently been described in human neonates (Roffwarg et al., 1962) and in newborn kittens (Jouvet et al., 1962). Since a newborn infant cannot be capable of possessing visual imagery, there can be no possibility of the rapid eye movements representing responsive movements to such imagery. It is possible that as the infant grows, with acquisition of perception, memory and parallel dreaming functions, a correspondence develops between the spatial pattern of the rapid eye movements and the visual imagery of the dream in a similar fashion to the development of speech with modification of the natural respiratory movements of breathing. Roffwarg et al. suggest that the presence of rapid eye movements in neonates may be analagous to the occurrence of those in decorticates, both probably being dependent upon brainstem function.

Oswald (1962a) raises a theoretical objection with regard to the consideration of the rapid eye movements as scanning movements of the dream imagery. He maintains that the dreamer, spatially disorientated and with eyes closed, must construct a frame of

reference with respect to his own body in order for the eyes to move conjugately over the dream imagery, and that it is not necessary for the eyes to move for spatial and movement perception in dreams, since vivid fantasy images and the after-images of dreams move with the eyes. Oswald argues that since the dream imagery is central in origin, movement of the eyeballs is irrelevant to the perception of change of position within this visual field of fantasy. However, such a teleological argument does not preclude the possibility of such eye movements, since although they are unnecessary for perception of space and movement in dreams, the dreamer can still make responsive eye movements to central fantasy images, being unaware that such eye movements are ineffective in determining his perceptions, and indeed directional eye movements are made in response to the imagery of hypnotic dreams (see Appendix C; and Schiff et al. (1961)). A frame of reference need not be "constructed" since it is implicitly given by the dreamer's awareness of his own body. Furthermore, although perception of movement and position may be derived from the dream imagery itself, that of direction requires a frame of reference external to the visual imagery. An isolated object can be perceived to be upsidedown in a dream, but such an attribute can only be determined by reference to coordinates external to the image, namely, those of the body schema which the dreamer may still retain while dreaming. Finally, if the argument put forward by Oswald be valid with regard to the rapid eye movements, then it should be equally so with regard to the skeletal movements which are frequently observed during dreaming. However, the observations of Max (1935), Dement and Wolpert (1958), and Wolpert (1960), suggest that electromyographic activity in the peripheral musculature is

correlated with the action of the dream; and Oswald (1962a) cites a case of a bus driver who, following the experience of running over a girl, relived it in his nightmares on the night after the accident, smashing the end of his bed when "putting on the brake".

CHAPTER IV.

SLEEP, MELANCHOLIA AND BARBITURATES.

No small art is it to sleep; It is
necessary for that purpose to keep awake all day.

(Nietzsche, Thus Spoke Zarathustra,

Pt. 1, Ch. 2.)



Melancholia and Barbiturates: A Controlled EEG, Body
and Eye Movement Study of Sleep.

By

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Insomnia is widely accepted as a leading feature of that illness designated by the number 301.1 in the International Classification of Diseases. The name given varies—"endogenous depression", "manic-depressive psychosis/depressive type", "melancholia" or "depressive illness". The present generation of laymen (not to say some psychiatrists) use the word "depression" so freely in order to describe an unpleasant, unhappy mood, whether lasting or transient, that one may prefer the term *melancholia*, or at least "depressive illness", to signify that condition which justifies the number 301.1. The adjective "endogenous" implies for many that environmental stress plays little or no part in the onset of the illness; we cannot accept that this is always so. The term "reactive" is used in several ways, generally to indicate that the state of unhappiness arises out of some external circumstance and that it would end when circumstances improved or the individual accepted the realities of practical life. The patients used in the present study were suffering from an illness of a kind which we believe may sometimes develop in the absence of severe environmental stress, while in others it may be clearly provoked by circumstances, but the illness, as it develops, may take on a form which becomes largely independent of the environmental circumstances and may continue even when the provoking factors are past; it has become an *autonomous melancholia*. It will be apparent that by autonomous melancholia we mean an illness shown by clinical experience to respond especially well to electroplexy.

In the electroencephalogram or EEG, we today possess the best available tool for the study of insomnia and all-night sleep. The demands on labour and paper of such studies are heavy. The fact that in this study only six patients have been used and that nevertheless a page by page analysis of no less than 13 miles of paper was required, serves to explain why no adequate EEG study of this kind appears hitherto to have been undertaken.

In the last few years, there have been fundamental advances in our knowledge of nocturnal sleep, arising out of the initial work of Dement and Kleitman (1957a) and their colleagues. These advances, which have been reviewed (Oswald, 1962a), concern the presence of cyclical changes in the character of nocturnal sleep. About every one-and-a-half hours, the EEG changes to a low voltage pattern containing some alpha rhythm, but also, in many people, saw-toothed waves (Fig. 1) of unique appearance (Schwartz and Fischgold, 1960; Oswald, 1962b). These waves usually (Berger *et al.*, 1962) immediately precede a burst of rapid conjugate eye movements. These events continue for some 10-50 minutes before the EEG changes again to the traditional sleep pattern of spindles and high voltage slow waves with ocular repose.

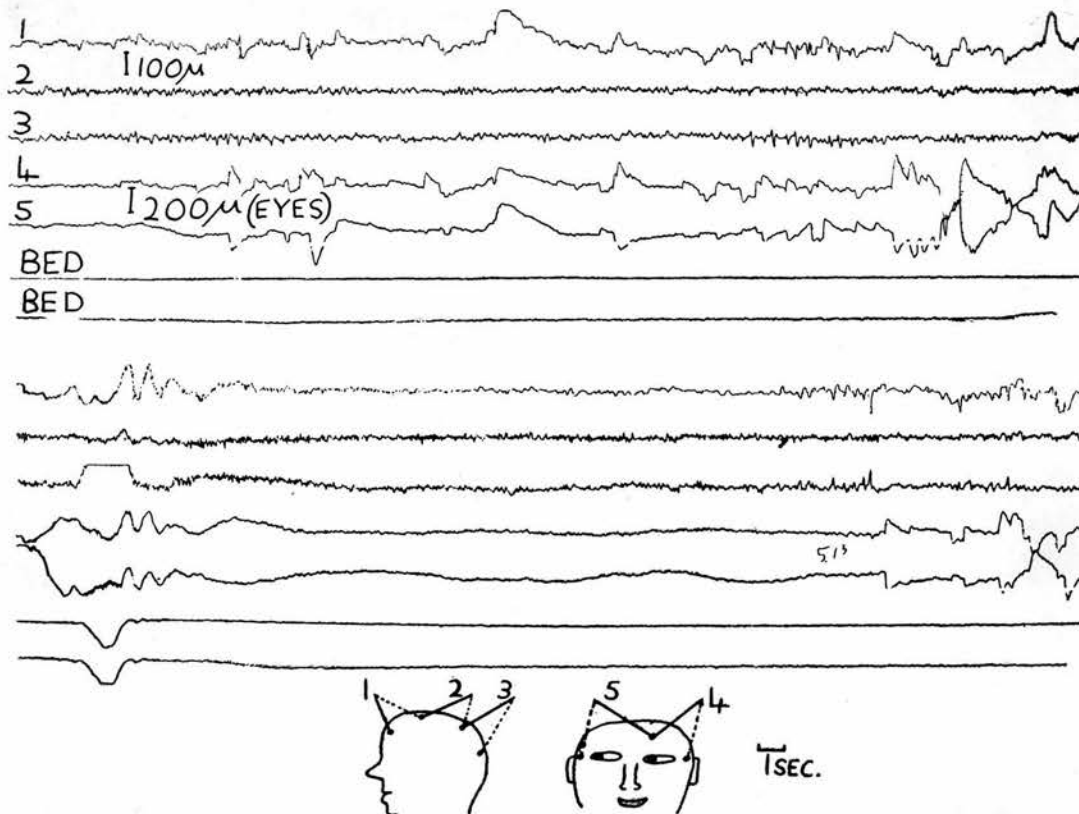


FIG. 1

Control No. 6. A segment of a rapid eye movement (REM) or paradoxical sleep period. The upper and lower excerpts are continuous with one another. Note the rapid, jerky movements of the eyes, followed by more gently rolled eye movements at the time of the major body movement (see deflection of the "BED" channels). EEG rhythms of alpha frequency are associated with the body movement but the slower, low voltage EEG waves of paradoxical sleep then return and rapid eye movements recur, being preceded by a brief burst of "saw-toothed" EEG waves, best seen in leads 1 and 3. Bursts of similar waves can also be seen in the upper excerpt.

The periods of sleep with low voltage EEG and rapid eye movements (REMs) have been termed "REM periods" or the "paradoxical phase" (Jouvet *et al.*, 1960) of sleep (see Fig. 1) and are accompanied by irregularity of heart rate and respiration, and a profound decline of tonus of certain neck muscles in the cat (Jouvet *et al.*, 1960), and the human (Berger, 1961; Oswald, 1962b). The work of Dement and Kleitman (1957b) indicating that dreaming accompanies the REM periods has since been abundantly confirmed. Goodenough *et al.* (1959), however, noted that some persons, when awakened from their recurrent REM periods, would not say they had been "dreaming" unless their experiences had been of a bizarre and internally inconsistent nature, but would claim they had been "thinking" and that they had been awake while doing so. The question therefore arose whether patients suffering from autonomous melancholia who claim that they are recurrently awake and "thinking" unhappily during the night might, in fact, be referring to paradoxical sleep rather than to true wakefulness, or whether they might spend an abnormal proportion of the night in such sleep, as the excess of low voltage EEG sleep in such patients claimed by Diaz-Guerrero *et al.* (1946) would suggest.

The cyclical changes in the EEG taken by themselves would suggest that paradoxical sleep is light sleep. Might patients with autonomous melancholia therefore tend to waken, if at all, at these times rather than randomly during the night? If so, they would become selectively deprived of that particular variety of sleep, deprivation of which, when effected deliberately, has been claimed to have adverse psychological sequelae (Dement, 1960).

It was thought probable that such patients do genuinely waken to excess, for they will often describe rising to make a cup of tea or to contemplate the gas oven. On the other hand, some patients claim to have been awake all night when nurses report them to have been asleep. A nurse might do so, however, while paradoxical sleep was in progress, during which the patient may be conscious of "thinking", and Dement and Kleitman (1957a) reported that "gross body and limb movements were decreased during rapid eye movement periods"—a fact which led us to distrust motility measures as indicators of sleep and insomnia (a distrust in no way dispelled by our results). It is, of course, well known that individuals may deny having slept briefly when the EEG and other physiological variables indicate they have actually slept (Oswald, 1960) and may indeed claim to have been awake all night when the EEG has indicated continuous slumber and where they have failed completely to respond to prearranged stimuli (Held *et al.*, 1959; Schwartz and Fischgold, 1960).

Motility studies of the sleep of patients bearing the diagnosis of manic-depressive disease were described by Kleitman (1939). The value of using chronic, institutionalized patients is doubtful, however, and we take the view that in these days of the EEG, motility studies alone are obsolescent. We therefore carried out motility recording simultaneously with recording of the EEG and of eye movements.

We considered it essential that patients should be compared with normal control subjects studied under identical conditions (alternately with the patients over the course of nearly a year), and that sex and age should be matched. McGhie and Russell (1962) report considerable variations with age and sex of persons' own opinions about their sleep. Since we knew of no comparable controlled study of all-night sleep using barbiturate hypnotics—despite the vast quantities of these drugs in use—we took the opportunity to study the effects of heptabarbitalone (Medomin) in clinical dosage.

Diaz-Guerrero *et al.* (1946) carried out an EEG study of the "sleep of patients with manic-depressive psychosis, depressive type". Recordings from six patients on one night each were analyzed and comparisons made with analyses published by another author of the sleep of normal subjects. The environmental conditions of sleep, the ages of those studied, and the criteria used in the two groups of analyses may well have varied. One patient slept only 106 minutes, the other five were awake from 5 to 19 per cent. of the possible 8.5 hours. It was reported that the patients spent over twice as much of the night with the low voltage record of light sleep (which we might equate with paradoxical or dreaming sleep) as had been reported for normals. The figures for normals appear to us to be quite remarkably low at 19 per cent. The findings were not supported by any reference to statistical significance and in view of the small number of nights it is doubtful whether they could have been. The same investigators compared the patients' sleep with that of three control nights specially carried out under similar conditions and reported that the depth of sleep of the controls varied much less frequently during the night, but again no statistical tests were applied and, perhaps more important, no precautions appear to have been taken to minimize subjective bias in the inspection of the recordings. Our investigation was partly designed to test their claims.

METHOD

Patients and controls each slept for five nights in a bedroom alone. The EEG room was separated from the bedroom by an empty room, but a microphone and amplifier system enabled the subject to be heard if she called out or if she grunted or spoke in her sleep, and even her breathing was audible.

On the first night, intended for adaptation, electrodes were attached to the patient exactly as on other nights, but no actual recording was made. All received two 200 mg. tablets of heptabarbital on that night. None of the patients or controls had received any hypnotics on previous nights for at least one week and only patients Nos. 1 and 6 had received hypnotics prior to that. Patient No. 2 had a severe hangover the next morning, to the extent of causing nausea and slight vomiting, and therefore on subsequent nights she received only one tablet whether dummy or real. Her control, by coincidence, had an equally severe hangover after the first night and also received only one tablet on subsequent nights.

The second to fifth nights were recording nights. Except as mentioned above, all subjects received two 200 mg. tablets on retiring according to the following scheme on consecutive nights, where D=dummy and M=Medomin.

1. Patient aged 52, control aged 49. M D D M
2. Patient aged 57, control aged 62. M D M D
3. Patient aged 33, control aged 29. D M M D
4. Patient aged 48, control aged 50. D M D M
5. Patient aged 51, control aged 50. D D M M
6. Patient aged 67, control aged 59. M M D D

The dummy tablets were identical in taste and appearance with the real tablets.

An antero-posterior chain of silver cup electrodes containing electrode jelly was attached just to the left of the midline and a further electrode near each outer canthus, enabling the electro-encephalogram and the electro-oculogram to be recorded. Electrodes on the scalp were affixed with collodion and those on the face with adhesive plaster. After a final visit to the toilet, the subject got into bed and the electrode wires were connected to a head box. The wires were collected together into a bundle with tape and were amply long enough to allow movement. Electrodes attached in this way are comfortable and not noticeable after a few minutes.

A special bed was used. On a divan base was a mattress containing three "Bowden cables" running through its length. One end of each cable was fixed, the other end attached to a steel ruler which it held slightly bent. Any body movement altered the cable tension and the bending force applied to the ruler. On each ruler was a strain gauge. These were in series and any change in the degree to which they were bent altered their electrical resistance and disturbed the balance in a Wheatstone's bridge circuit. When any such disturbance of potential occurred, it could be recorded directly on the EEG machine (see Figs. 1 and 4). It was a highly sensitive device.

All recordings were made with a paper speed of 1.5 cm./sec. and time constants of 0.3 sec. as standard. Recording began when the subject got into bed. This was generally about 10.45 p.m., occasionally slightly earlier or, if technical trouble arose (generally 50 c./sec. artefact), rather later. Recording was continuous through the night except for occasional breakdowns of a matter of minutes (distributed roughly at random through the 48 nights) or when a patient called out for a bed-pan. Recordings ended by 6.30 a.m.

Three EEG channels and two eye-movement channels (see Figs. 1 and 4) were recorded. Two identical channels were used for bed-movement recording in order to detect rare machine-induced brief drifts in one or other channel.

Patients were told that they were to undergo special investigation and that we should gain valuable information about their illness while they slept, which would help us to decide on the best form of treatment. Although they were always asked the next day how they had slept, no stress was laid on this nor any suggestion given that we really wanted to discover how much they slept. They were all given rather more than usual doctor-time by day and they seemed to derive comfort from getting special attention.

The controls were all paid (30s. per night). None had a history of nervous disorder and except for No. 5 they were all previously known personally to us. Nos. 1, 2 and 6 were domestic staff of Jordanburn Hospital, Nos. 3 and 4 were senior members of the nursing staff, and No. 5 was a blacksmith, the husband of No. 1.

In brief, the clinical features of the patients, which illustrate the diagnostic criteria used, were as follows:

PATIENT No. 1

Married female, aged 52. Father had history of mental hospital admissions, dying in last. One sister committed suicide five years before. Another sister treated for depression in another mental hospital two years before. One year feeling depressed, and complaining of insomnia and inability to concentrate. Apathetic, inactive, shunning company. Frequent weeping. At this stage, used in present investigation.

Six E.C.T. with recovery. Discharged three weeks later. After two weeks, admitted under certificate to another mental hospital on account of acute mania. Recurrent manic and hypomanic episodes for six months, finally discharged after further three months.

PATIENT No. 2

Married female, aged 57. Mother an energetic midwife. Five miscarriages, no children. Mildly depressed at menopause 1946. Typical depressive illness 1957, treated successfully with E.C.T. Also 1959, when again had E.C.T. Very active, bustling woman when well. Pyknic build. November 1960, had 'flu, depressed after. Seen in March 1961. Sitting about in agitated state, weeping, unable to do housework for month. No interest, "tired", waking in the night and weeping, shunning company. Wanting to "sleep away" from life. Speaking little except repeatedly about having had no children.

Seven E.C.T. with recovery. Follow-up after three months revealed a lively, ebulliently cheerful woman with no complaints; very busy.

PATIENT No. 3

Married woman, aged 33. Mother died in childbirth. One sister had puerperal depressive illness. During fifth (unwanted) pregnancy, became depressed. Onset of severe agitated preoccupation two weeks after birth. Thoughts that she should kill her children, husband and self, by gassing. Self-reproach great. Fears of bodily disease and insanity. No interest. Complaint of broken sleep. Much weeping. No previous psychiatric trouble. Used in this investigation.

Nine E.C.T. Discharged cheerful, well and active. Relapsed after month. Imipramine, 150 mgms. per day, as O.P. Gradual recovery, discharged five months later, advised Imipramine continue six months. Unfortunately, it was stopped. Relapsed. Seen two months later, extremely depressed, retarded, unkempt, sitting weeping, not eating, complaint of insomnia, preoccupation with death and suicide. Five E.C.T. and Imipramine, 150 mgms. per day, rapid improvement but still not quite recovered after four months.

PATIENT No. 4

Married male, aged 48. Printer's assistant. Parents' marriage broke up when patient aged 12. Over-strong attachment to mother, visiting her daily even after own marriage. Past history of haematemesis, perforated duodenal ulcer and partial gastrectomy 13 years ago. Grief reaction to mother's death seven months before had changed into state of increasing apathy, loss of interest in normal activities, inability to work for a week, anorexia and loss of weight, inability to concentrate, fears of insanity. "Thoughts racing" while lying awake at night, suicidal ruminations and misery. Frequently overcome by strange fears (of crossing the road, etc.); avoided company; feeling people might be talking about him. Complaints of bodily weakness; of weight pressing on head; fears of serious chest disease. His wife and work-mates found him silent and tearful, quite unlike his usual "life and soul of the party" way.

Six E.C.T. Became temporarily overactive. Back to work two months after first attendance. Discharged a month later—"champion in my spirits".

PATIENT No. 5

Married male, aged 51. Miner (underground). Rigid upbringing in narrow religious sect. Attended August 1961 after feeling tired and unwell for a year. Tonsillectomy November 1960 had not revived him. Off work two months; total loss of interest, sitting staring out of window all day, trembling; fears of "collapsing". Often near to tears. Claimed not slept at all for several weeks; band-like discomfort round head. Never like it before in life. Enquiries at work revealed a well-liked, conscientious worker.

Nine E.C.T.; greatly improved; a few complaints about his head. After four weeks; feeling "numb" in head, fears of "clot of blood", feelings of hopelessness. Imipramine, 150 mgms. per day, started, with steady improvement. December 1961, feeling very well, lively, cheerful, back at work underground.

PATIENT NO. 6

Female, aged 67, single. Father, an energetic man, committed suicide by drowning, aged 69. No previous personal psychiatric trouble. Became agitated and miserable January 1960. On day prior to admission, April 1960, made serious suicidal attempt (coal gas).

After resuscitation, treated with nialamide with moderate improvement. Worsening of depression, readmission September 1960, recovery after eight E.C.T. Well until July 1961. Readmitted October 1961. Miserable, weeping, "throbbing" in head, sternum and stomach, "weakness" in legs, everything an effort, shunning company, wishing could die. Reported insomnia and improvement of mood in later part of day. Used in this investigation.

Treated with hypnotics and with imipramine, 75 mgms. per day. Steady recovery. Six months follow-up; very well, cheerful, busy, sewing, reading, playing piano, singing at her housework; going out each afternoon.

ANALYSIS OF RESULTS

Since all EEG interpretation is subjective and since it was necessary to determine the length of time per night in the various stages of sleep, it was important to minimize subjective bias. Therefore, the 48 recordings were eventually each assigned a code number in irregular order (by R.J.B.) and each was presented, again in irregular order, to one of us (I.O.), who was therefore not aware whether the recording was from a patient or from a control. Heptabarbitalone does not seem to produce much barbiturate fast activity in the EEG and, in fact, the scorer was never aware of whether a particular record was of a night on which real or dummy tablets had been given.

A page by page analysis was made and the time of first falling asleep (onset of spindles or Stage C) noted and the times of all subsequent changes of sleep depth, including very brief ones following a movement in sleep, provided the change persisted for 10 seconds or more. The time of each movement was noted and whether it was isolated or part of a quick succession of movements (so that, when desired, the latter could be scored as one major movement in some of the statistical analyses). It must be pointed out that each movement was seen as a brief oscillation and no account was taken of its size or of the number of changes of pen-direction within what clearly represented a single movement of the body. The movement scores therefore differ in nature from those of some other workers who have recorded some integrated form of total movement energy output. The time of the first and last REM in any unbroken part or the whole of a REM period was noted.

The stages of sleep noted were those described as A to E by Loomis *et al.* (1937). Stage A corresponds to wakefulness or near-wakefulness; included as Stage A were brief periods of 10-120 seconds where rhythms of alpha frequency covered most of the head after a movement and arousal from, say, Stage C. There are many such brief periods in nocturnal sleep and it is very doubtful whether the disoriented slumberer becomes sufficiently aware of reality at these times to remember them in the morning. A few muttered, incoherent words may accompany the initial movement (more rarely a few words are muttered during the REM periods). Stage B denotes a low voltage record with predominant 3-6 c./sec. waves. An EEG pattern of this nature appears when the individual passes from wakefulness to Stage C, but also during the REM periods. The EEG characteristically found during the REM periods has been designated Stage B in this investigation and accounts for all but a very small amount of the Stage B scores. It often begins just before, and usually persists longer than the REMs and (Dement and Kleitman, 1957a) is a better measure of dreaming-time than the "REM times" in the scores—namely time from first to last REM within any unbroken period of Stage B with REMs.

Actually, the unique saw-toothed EEG waves mentioned previously were commonly the first sign that a change was taking place from Stage C to Stage B with REMs, frequently appearing as a brief burst half a minute before the change from Stage C to Stage B (Oswald, 1962b).

When all the records had been thus analyzed, the code was broken (by R.J.B.) and statistical analyses made, using analysis of variance and a two-way classification: patients/controls and dummy/Medomin.

The times at which the subjects first fell asleep (onset of spindles or Stage C) varied from 10.23 p.m. to 12.17 a.m., with the exception of Patient No. 1, who on her second dummy-tablet night did not fall asleep until 3.41 a.m.: for that night, the arbitrary time of 12.00 midnight was taken as the time of commencement for data included in the statistical analysis.

Recording generally ceased between 6.00 and 6.30 a.m. However, in a few instances, patients terminated the recording earlier by getting out of bed, switching on the light, etc., following a period of wakefulness. Only in the case of the second night of Patient No. 1 did this occur earlier than 5.30 a.m. No arbitrary correction in respect of these few variations has been made to the figures for the number of movements and the time in Stage A, the figures for which would presumably have been increased had the patients continued to lie awake in bed and recording been continued. Equally, no corrections have been made for the fact that a few minutes were occasionally lost through, for instance, paper-stoppage—such incidents were presumed to be random.

An attempt was made to determine whether heptabarbitalone affected the amount of rapid eye movements occurring within a given duration of a REM period. The records of the controls only were taken and each of their heptabarbitalone night records was examined by R.J.B. so that periods of five minutes at the start of the second and third REM periods of the night were chosen. In two instances, only one REM period of sufficient duration was present.

In the case of each recording, the corresponding duration within the corresponding REM period of the recording on the dummy tablets was also chosen. The relevant portions of the records were then all presented in random order and with only a code number to I.O., who counted what he judged to be the individual rapid shifts of eye-direction. The code was then broken and the results analyzed.

RESULTS AND COMMENTS

The main results are summarized in Table I, which shows mean values. Where probabilities are not shown in the three right hand columns, they did not approach statistical significance.

TABLE I

	CONTROLS		PATIENTS		P VALUES OF STATISTICAL SIGNIFICANCE (Analysis of Variance)		
	Dummy	Medomin	Dummy	Medomin	Medomin/ Dummy	Controls/ Patients	Inter- action
WHOLE NIGHT							
Movements	77	70	117	63			
Movements/min. $\times 100$..	18	16	28	5	.05		
% Time A Stage	45	24	109	37	.01	.01	
% Time B Stage	28.4	17.8	25.6	19.6	.001		
% Time C Stage	45.0	55.1	39.0	41.9		.025	
% Time D Stage	20.3	22.8	27.4	27.6			
% Time E Stage	5.6	4.4	8.0	11.2		.05	
% REM Time	23.3	11.8	20.6	14.8	.001		
Shifts of depth/min. asleep $\times 100$	19	17	25	18	.025		
Ditto to A Stage	6	5	9	5	.025		
1.30 TO 5.30 A.M.							
Movements	40	35	69	40	.06	.06	
Time A Stage (min.) ..	23	12	76	18	.001	.01	.025
Time B Stage (min.) ..	68	49	48	54			.05
Time C Stage (min.) ..	104	134	64	108	.001	.01	
Time D Stage (min.) ..	37	36	38	49			
Time E Stage (min.) ..	3.8	4.1	4.8	10.3			

A. *Whole night*

The mean total recording time spent per night in Stage A, or wakefulness, after the time of first falling asleep, was significantly greater ($P < .01$) in the patients than in the controls, and was significantly reduced by the drug ($P < .01$).

The figures for the total time spent in each of the Stages B, C, D and E of sleep are expressed as mean percentage of total time spent asleep on each night, rather than as absolute figures of mean total duration spent in each stage. Differences in percentage figures thus indicate differences in the overall sleep pattern, whereas differences between absolute figures might result from differences in total sleep time owing to different times of falling asleep and variation in time later spent awake and in hour of rising. For the same reasons, movements and shifts of depth of sleep are expressed as mean frequencies.

Heptabarbitalone significantly reduced the frequency of movement ($P < .05$), and shifts of depth of sleep, both from one stage to another and also to Stage A alone ($P < .025$). Most striking was the reduction of percentage time in Stage B sleep ($P < .001$). Most of this time was contributed by the REM periods and the EEG Stage B which accompanies and often exceeds the duration of REMs. The percentage time of the night occupied by actual REM periods was similarly reduced by the drug ($P < .001$).

The percentage time spent in Stage C sleep by patients was significantly less than controls ($P < .025$), but the percentage time spent in Stage E sleep significantly greater ($P < .05$). These figures suggest that patients, since they spend significantly more time awake at night, are sleep deprived so that when they do sleep they spend more time in Stage E sleep (traditionally identified as deep sleep), for the latter is known to be increased after sleep deprivation (Berger and Oswald, 1962). The finding might also be influenced by the fact that, as the number of hours asleep per night increase, there is normally a decline of time in Stage E and increase in time of Stage C.

As previously noted, patients were not pressed to describe how they had slept, but the descriptions they did volunteer showed a much closer agreement with that which the EEG revealed than had been expected.

B. *The hours 1.30-5.30 a.m.*

At the outset of the study, it was decided that particular attention would be paid to the time 1.30-5.30 a.m., the early morning hours during which the patient suffering from melancholia traditionally lies awake. During these hours, outside noises from vehicles and hospital activities are minimal, and the figures are independent of variations in time of getting to sleep, some of which arose from technical difficulties in applying electrodes and getting artifact-free recordings.

Patients spent very much more time awake during these hours ($P < .01$). Heptabarbitalone greatly decreased time awake ($P < .001$), especially in the patients (there being a significant interaction, $P < .025$) in whom, of course, there was much more scope for its effect.

A significant interaction between the two variables was present in the mean time spent in Stage B sleep. Patients on dummy tablets spent significantly less time in Stage B than controls, but this can be accounted for by the diminished total time spent asleep during those hours among the patients. Similarly, patients spent significantly less time in Stage C ($P < .01$). Heptabarbitalone increased ($P < .001$) time spent in Stage C, at the expense of time awake and Stage B.

C. *The pattern of wakefulness*

It had been an object of special interest to determine whether the periods of wakefulness among the patients had a relation in time to the cyclical changes in the character of sleep during the night. The numerical findings do not give any indication of, for instance, selective wakefulness in place of REM periods. It was necessary, however, to examine the distribution of wakefulness, which may be seen in Fig. 2, in which the times of awakening for periods of one minute or longer appear to be random, and in which it may be seen that even when little sleep was obtained a proportion was occupied by REM periods.

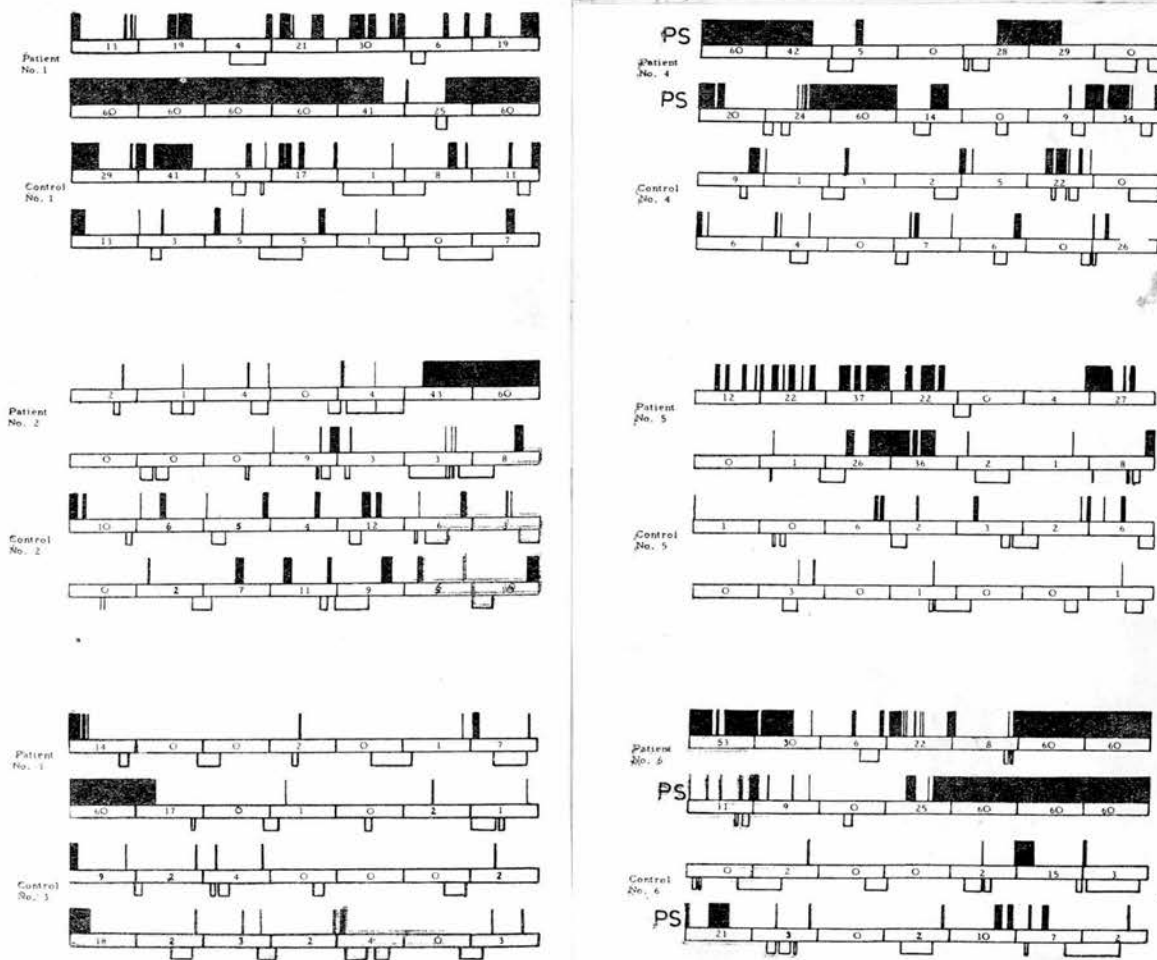
D. *Body movements*

Separate analyses were made in respect of scores of individual movements and of scores where a closely grouped series of movements was counted as a single movement. The latter manoeuvre did not reveal any additional information and only data of the former class are given in Table I.

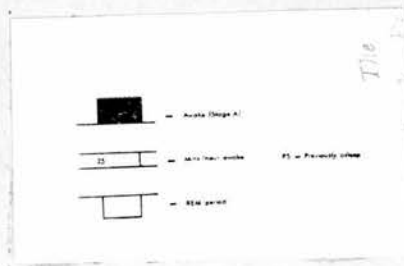
As previously noted, other workers have attempted to study the sleep of psychiatric patients using motility indices, but when used concurrently with the EEG we found the latter a

FIG. 2A-AND-2B

Sleep pattern between 11 p.m. and 6 a.m. on the 24 dummy tablet nights of both patients and controls. Each transverse block system represents one whole night.



The periods of wakefulness of EEG Stage A have been plotted except where the duration of such episodes was less than one minute. The greater proportion of the night spent awake by the patients compared with the controls can be readily seen, the number of minutes awake in each individual hour between 11 p.m. and 6 a.m. being shown. The lower, unfilled blocks represent the time between onset and offset of unbroken REM periods, from first to last rapid eye movement. No obvious relation between REM periods and wakefulness in the patients can be seen. Even when sleep is much reduced some of it is taken as paradoxical sleep with REMs (see, for instance, the second nights of patients No. 1 and No. 4).



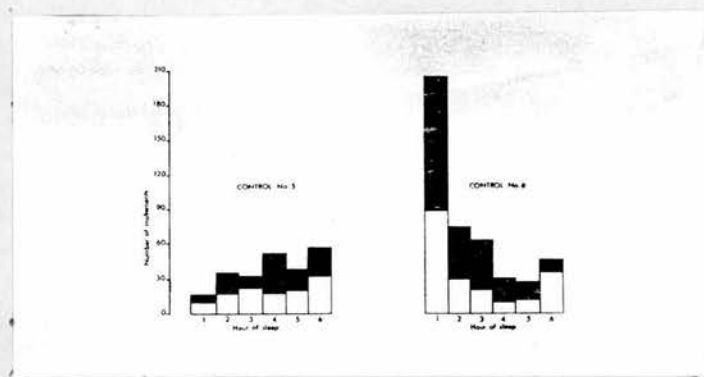


FIG. 3

The histograms show the number of movements per hour for the first 6 hours after first falling asleep. The solid areas indicate the sum of the movements during the two heptabarbitalone nights, plain areas indicating dummy tablet nights.

The contrast between the distribution of movements within the nights of these two subjects should be noted. Although most of the movements by No. 6 occurred early in the night they took place actually during sleep, for example, only 19 movements in the first hour and 5 in the second hour occurred during brief periods of wakefulness.

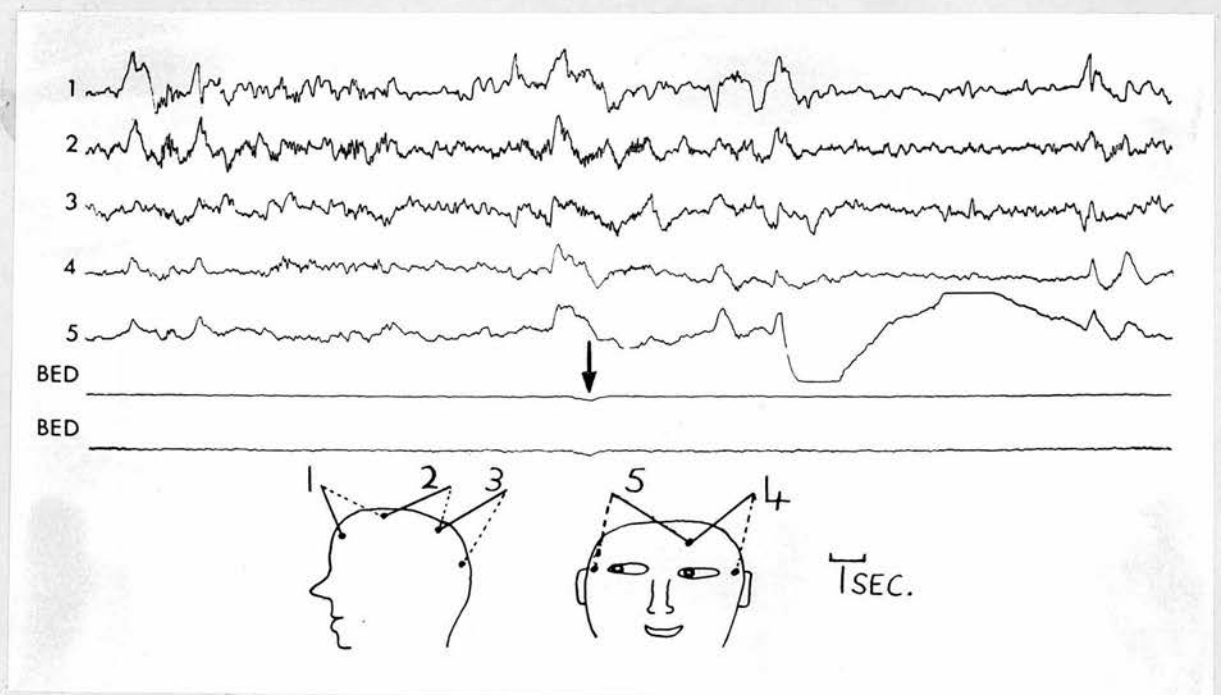


FIG. 4

Control No. 6. The EEG shows the high voltage slow EEG waves and the faster spindles of Stage D (contrast with Fig. 1). The EEG potentials are picked up by the electro-oculogram (channels 4 and 5) but actual eye movement potentials are absent. Despite the deep sleep the BED channels reveal one of many body movements (see Fig. 3).

very much more sensitive discriminator between both classes of variable. In fact, mean total movements over the whole night and between 1.30 and 5.30 a.m. (see Table I) failed to discriminate at satisfactory levels of statistical significance. In our recordings, we observed, as did Brooks *et al.* (1956) and Coleman *et al.* (1959), that, in general, movements were fewest in the earlier hours of the night, when the high voltage EEG Stages D and E were most manifest. It is, however, worth emphasizing that there are big individual differences. Some will move much more in the first half of the night than the second (Fig. 3) even while sleep is, by traditional EEG criteria, deep, with the Stage D pattern present (Fig. 4). Some people will lie awake and move little.

A comparison was made, based on dummy tablet nights only, of the frequency of movements in sleep of D and E Stages on the one hand and in paradoxical sleep with Stage B EEG in association with REM periods, on the other.

Two different methods of assessment were made, namely, D + E "pure" and B "pure"; D + E "overall" and B "overall". The "pure" scores were derived from the number of movements during discrete periods of the Stage B record or the record of Stages D and E. The "overall" scores were obtained by noting the number of movements between the first and last moment of Stage B or Stages D and E respectively within any given cycle (by EEG criteria, sleep appears to undergo cyclical rises and falls of depth during the night) even if there were gaps of several minutes with Stage A or Stage C intervening. A movement often terminates a period of both Stage B and Stage D or E, and these terminating movements were included in the scores (only the first movement if there were a group of them).

Mean "pure" movements \times 1000/min. with EEG Stage B

in patients=146

in controls=168

Mean "pure" movements \times 1000/min. with EEG Stages D and E

in patients= 62

in controls= 79

Mean "overall" movements \times 1000/min. with EEG Stage B

in patients=138

in controls=186

Mean "overall" movements \times 1000/min. with EEG Stages D and E

in patients=101

in controls= 97

Analysis of variance showed no significant difference between controls and patients but the much higher frequency of movement in Stage B than in Stages D and E was significant ($P < .001$ in the case of the "pure" category, and $P < .05$ in the case of the "overall" category).



A further assessment was made of movements during discrete periods of Stage C record (or C "pure").

Mean movements \times 1000/min. with EEG Stage C

in patients=137

in controls=139

Analysis of variance showed that though less than the figures for Stage B the difference was not significant. On the other hand, the frequency of movements in Stage C was significantly ($P < .025$) greater than in Stages D + E ("pure").

E. The frequency of rapid eye movements

The actual frequency of rapid movements of the eyes during a REM period in the controls was diminished in every case by the heptabarbitalone except in the case of control No. 2 (who, it will be recalled, received only half as large a dose). The analysis covered a total of 3 hours 40 minutes and the actual scores of eye movements for total individual samples of 20 minutes (except for controls Nos. 4 and 5, where the samples totalled 15 minutes) were as follows:

	Dummy	Medomin
Control No. 1	831	311
2	238	267
3	577	326
4	300	254
5	262	235
6	899	481

A *t*-test for significance of mean difference between the paired 5-minute samples showed that this reduction of the frequency of eye movement activity within on-going REM periods was significant ($P < .02$).

DISCUSSION

A notable feature of the investigation was its failure to reveal any characteristic abnormality of sleep in melancholia other than the excess of wakefulness. Wakefulness recurred frequently during the night rather than sound sleep followed by early final waking (Fig. 2). In particular the episodes of wakefulness were not related to the recurrence of paradoxical sleep or REM periods. Furthermore, the claims of Diaz-Guerrero *et al.* (1946) were not substantiated; patients showed no excess of light sleep, in fact the reverse, while they did sleep; and their slightly greater frequency of shifting of sleep depth was not statistically significant, and bore no similarity to the large difference in this respect claimed by Diaz-Guerrero and his colleagues from their much smaller series.

Apart from the expected increased duration of sleep, the outstanding effect of heptabarbitalone was the reduction in paradoxical sleep—a reduction of dreaming. This is of interest in view of the evidence that there is a

specific need for this kind of sleep, deprivation of which may have adverse sequelae (Dement, 1960). We do not of course know whether the effect might disappear if heptabarbital were repeated over a larger series of nights.

The reduction of body motility during the night caused by heptabarbital is consistent with the similar reduction by pentabarbital (Brazier and Beecher, 1952; Hinton and Marley, 1959).

It has been claimed that the rapid conjugate movements of the eyes represent scanning movements in response to the visual imagery of the dream (Dement and Wolpert, 1958). In conformity with such a view is the absence of REMs in those with life-long or nearly life-long blindness (Berger *et al.*, 1962). The alternative is simply to regard the REMs and the associated saw-toothed EEG waves as neurophysiological concomitants of paradoxical sleep without reference to conscious content. The fact that heptabarbital decreases not only paradoxical sleep duration but also depresses one of its most striking features, namely, the frequency of eye movements, could be interpreted either as a demonstration of a simple neurophysiological effect or it could be argued that barbiturates have a tranquillising effect on fantasy life, so that there is less activity at which to "look" during dreaming—thus it has been claimed that dreams of, e.g., television viewing, are accompanied by less REM activity than, say, watching a lawn tennis game (Dement and Wolpert, 1958).

Aserinsky and Kleitman (1955) first reported increased body motility in association with REM periods, but then Dement and Kleitman (1957a) described decreased motility during REM periods. Furthermore, some authors have felt inclined to describe paradoxical sleep as "deep" sleep (e.g., Rossi *et al.*, 1961) owing to the raised threshold for full arousal of the cat, on reticular formation electrical stimulation (Benoit and Bloch, 1960).

It is traditional to use the adjective "light" and "deep" in respect of sleep, the degree of inertia and unresponsiveness being greater in the latter. The EEG during paradoxical sleep is, apart from the saw-toothed waves, of the kind traditionally identified with light sleep, and indeed the presence of consciousness, even if only of a fantasy life, at these times is consistent with such a view. One of us had in the past taken the view that paradoxical sleep was light sleep (Oswald, 1962a) but, because of the muscle tonus changes previously mentioned, has now to accept that the term "light" sleep is inappropriate and that paradoxical sleep is a *different kind of sleep*. Nevertheless, in so far as one would use the adjective "deep" to describe sleep associated with few major body movements,

when a precise determination is made, as in section D of our results, it is clear that the adjective "deep" is more appropriate to human sleep of EEG Stages D and E than to human paradoxical sleep; significantly more movements occurring in association with the latter. Furthermore, the frequency of movements in Stage C sleep, being intermediate between the other two categories, was consistent with the traditional classification of sleep depth in terms of the EEG.

SUMMARY

Continuous nocturnal recording of EEG, eye movements and bed-movements was carried out on 6 patients, not previously receiving hypnotics, and 6 sex and age-matched controls. They were involved on five successive nights each—the first night being ignored. The patients were ill with typical melancholia ("endogenous depression" or "manic depressive psychosis/depressive type", 301.1 in the International Classification). According to a planned design, each patient received 400 mg. of heptabarbitalone (Medomin) on two nights and dummy tablets on two nights.

All the recordings were analyzed by one of us in ignorance of whether the record was that of a patient or of a control. Findings included (1) Patients spent significantly more of the night awake although times of awakening were not related to the recurrence of rapid eye movement periods ("paradoxical sleep"). Percentage time spent during the latter, and frequency of shifts in depth of sleep, did not differ significantly from the controls. (2) Heptabarbitalone greatly decreased duration of rapid eye movement (dreaming) periods and also the frequency of eye movements within those periods. (3) Heptabarbitalone decreased time awake, especially in patients in early hours of the morning, and decreased frequency of shifts of sleep depth and frequency of body movement. (4) The EEG discriminated far better than body motility, which is subject to large individual variations. (5) Body motility decreased according to traditional EEG stages of sleep depth, being significantly greater in association with "paradoxical sleep" than in association with traditional "deep" sleep.

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CHAPTER V.

EFFECTS OF SLEEP DEPRIVATION.

I have not slept one wink.

(Shakespeare, Cymbeline, III, iv, 104.)

EFFECTS OF SLEEP DEPRIVATION ON
BEHAVIOUR, SUBSEQUENT SLEEP,
AND DREAMING

BY

RALPH J. BERGER and IAN OSWALD

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EFFECTS OF SLEEP DEPRIVATION ON BEHAVIOUR, SUBSEQUENT SLEEP, AND DREAMING

By

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and

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INTRODUCTION

IN the course of the past few years, a series of related studies (Aserinsky and Kleitman, 1955; Goodenough *et al.*, 1959; Wolpert and Trosman, 1958) has demonstrated beyond doubt the association of normal dreaming with the appearance of rapid, binocularly synchronous eye-movements. It has also been claimed that the rapid eye-movements (REMs) represent scanning movements made by the dreamer as he "watches" the visual events of the dream (Dement and Kleitman, 1957a; Dement and Wolpert, 1958). The REMs are absent during dreaming among those with life-long blindness, but are retained for some years by those whose blindness arises later than childhood (Berger *et al.*, 1962a). In a study of undisturbed nocturnal sleep by Dement and Kleitman (1957b) periods of eye-movements were observed to occur fairly regularly at about 90-minute intervals throughout the night in association with the lightest phases of cyclic variation in depth of sleep, as indicated by the electroencephalogram (EEG). These REM periods had a mean duration of about 20 minutes, and 4-6 occurred per night.

The hypothesis has recently been put forward by Dement (1960a) that a certain amount of dreaming each night is a necessity. Following a series of nights of "dream deprivation" in which subjects were prevented from dreaming by being deliberately awakened at the commencement of their REM periods, Dement observed a marked increase in total dream time and percentage dream time on subsequent recovery nights of undisturbed sleep, as compared with that on a number of base-line nights prior to dream deprivation. He also reported that "dream deprived" subjects became unhappy and ill at ease. We understand that certain independent research groups in the U.S.A., in work as yet unpublished, have confirmed Dement's findings.

The aim of the present study was to compare the percentage dream time during nocturnal sleep before and after four consecutive nights without sleep. It was predicted by the authors when beginning the experiment that the percentage dream time would be markedly reduced after sleep deprivation and would then gradually return to the base-line levels on consecutive recovery nights, and that the sleep loss would manifest itself as an increase in percentage time spent in deep sleep on the initial recovery night. However, according to Dement's hypothesis, it would be predicted that the acquired dream-deficit following sleep deprivation should be compensated for by an increase in dreaming on subsequent recovery nights compared with that on the base-line nights.

The visual, auditory and somatic hallucinations, the intrusive thoughts, the bizarre verbal constructions with queer word play and neologisms, the paranoid delusions and failure of discrimination between fantasy and reality that occur in normal bedtime drowsiness and in sleep-deprived persons have been reviewed

(Oswald, 1962). Tyler (1955), Bliss *et al.* (1959), Brauchi and West (1959) and Morris *et al.* (1960) in particular have discussed the similarity of the thinking and perception of their sleep-deprived subjects to those of schizophrenics. In the present experiments, the opportunity was therefore taken to record any psychotic features of the subjects' experiences. These proved surprisingly frequent, and only representative examples are given below.

METHOD

The subjects, who were paid, were six healthy male medical students aged 21-24. They were informed of the nature of the experiment on personal interview.

Briefly, the experimental procedure was as follows. The experiment consisted of four stages:

- Stage 1. 2-3 adaptation nights of sleep.
- 2. 4 base-line nights of sleep.
- 3. 4 nights of sleep deprivation.
- 4. 4 recovery nights of sleep.

The entire experiment was performed using subjects in pairs.

1. *Adaptation Nights*

The subjects came to the laboratory at their normal bedtime and on the initial nights accustomed themselves to sleeping in the novel situation.

On the final adaptation night, the conditions represented those of the subsequent recording nights. Electrodes were attached to the head and the leads plugged into the headset placed between the parallel beds.

2. *Base-line Nights*

Each pair of subjects reported to the laboratory one hour before their usual bedtime. The EEG was recorded by means of an anteroposterior chain of silver-cup electrodes affixed with collodion, and eye-movements by means of the anterior EEG electrode and two other electrodes fixed just below the outer canthus of each eye with sticking plaster. The diagonal and asymmetrical electrode placement had the advantage of allowing both horizontal and vertical REMs to be recorded on the same channels. Two eye-movement and two EEG channels were recorded from each subject on an 8-channel electroencephalograph situated in a room adjacent to the bedroom.

3. *Sleep Deprivation Nights*

The subjects were instructed to remain awake at all times and were under close supervision by one of us (R.J.B.) throughout the night, and by the other (I.O.) during the day. They were stimulated to keep awake at night by playing cards, "Monopoly", table tennis, billiards, etc. During the day, they were constantly employed on simple tasks. The repeated introduction of variety into the activity of such subjects is essential for the maintenance of wakefulness.

4. *Recovery Nights*

These exactly duplicated the base-line nights except for the first recovery night, when the subjects retired to bed in the early hours of the evening and were

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allowed 12 hours sleep in comparison with 7-8 hours on the base-line and subsequent recovery nights. They were awakened at approximately the same time the following morning, so that they spent the same number of hours awake during the day before the second recovery night as on all other recording nights.

INSTRUCTIONS

The subjects were requested not to sleep at any time throughout the experiment, other than on the designated recording nights. They were also asked not to consume alcohol within the four hours before retiring and any consumed previous to that to be moderate in quantity.

RESULTS

The results may be considered in relation to nightly dream time, depth of sleep, and abnormal behaviour during sleep deprivation.

1. *Nightly Dream Time*

The times of onset and termination of dreaming were judged from the records by the first and last rapid eye-movements of a REM period. The relevant data are summarized in Table I.

Base-line Nights. Mean sleep time for the 24 nights was 7 hours 26 minutes, and the mean percentage dream time (mean total dream time to total sleep time $\times 100$) was 22.5 (Standard Deviation = 1.48).

Recovery Nights. Since the subjects were allowed 12 hours sleep on their first recovery night, the data given in the fourth column of Table I refer to the first part of the night corresponding to the mean sleep time of the base-line nights for each individual. As can be seen from the Table, the mean per-

TABLE I

Subject	Mean and Range Base-line Nights		Recovery Nights					
			% Dream Time and Total Sleep Time					II Equalized
	Total Sleep time	% Dream time	I	II	III	IV	I (Whole Night)	
S.A.	7h. 38m. 7h. 17m.-7h. 52m.	22.5 20.6-25.6	6.3	24.6 7h. 47m.	20.0 7h. 44m.	16.4 7h. 49m.	14.4 12h. 0m.	24.6
A.L.	7h. 7m. 6h. 49m.-7h. 15m.	22.7 18.8-25.4	—	23.1 7h. 47m.	27.1 7h. 41m.	28.1 7h. 49m.	11.9 12h. 0m.	23.0
A.M.	7h. 26m. 7h. 12m.-7h. 40m.	23.4 22.0-24.7	10.1	30.0 7h. 40m.	31.7 7h. 50m.	28.0 7h. 50m.	23.8 11h. 50m.	28.0
J.D.	7h. 42m. 7h. 17m.-8h. 00m.	20.4 17.5-22.7	5.4	24.0 7h. 39m.	26.8 7h. 57m.	22.5 7h. 51m.	12.4 11h. 55m.	24.0
K.M.	7h. 30m. 7h. 21m.-7h. 33m.	21.2 18.7-24.5	8.0	28.4 7h. 49m.	21.6 7h. 44m.	19.3 (16.4 B.L.) 5h. 22m.	22.9 11h. 48m.	28.4
C.S.	7h. 14m. 7h. 7m.-7h. 21m.	25.0 22.2-29.9	14.7	35.0 7h. 51m.	34.3 7h. 43m.	14.7 (19.6 B.L.) 5h. 20m.	24.0 11h. 55m.	31.3
Means	7h. 26m.	22.5	7.4	27.5	26.9	23.8 (last 4 subjects)	18.2	26.9
Level of Significance			.1%	5%	N.S.	N.S.	N.S.	2%

centage dream time was 7.4, which is roughly 30 per cent. of the group

base-line mean. This marked decrease was highly significant ($P < .001$) on the t-test for significance of mean difference (which was used in all statistical calculations).

Taking the whole of the first recovery night, the mean percentage dream time was 18.2, which was still less than that for the base-line nights, although the amount of dreaming increased considerably towards the latter part of the night.

On the second recovery night, the mean percentage dream time increased to 27.5, which represents a 20 per cent. increase of dream time over the base-line mean. This result was significant ($P < .05$).

Although the mean percentage dream time on the third and fourth recovery nights was still greater than on the base-line nights, the difference is not statistically significant.

The proportion of sleep spent in dreaming in normal persons increases with the duration of sleep. In order to test whether the significant increase in dream time on the second recovery night might not be due to an overall increase in total sleep time (since all subjects except J.D. slept longer on their second recovery night than the mean times for their base-line nights), the percentage dream time was recalculated (last column of Table I) by ignoring the final part of the record in all subjects which was in excess of their mean sleep time on the base-line nights. Although the group mean percentage dream time was reduced to 26.9, the increase over that of the base-line nights had a higher level of significance ($P < .02$) since the variance was reduced by this correction.

The figures given for the fourth recovery night of subjects K.M. and C.S. require comment. Unfortunately, the recording apparatus broke down in the latter half of the night and the percentage dream time figures are consequently reduced. The figures given in brackets are the mean percentage dream time for the same duration of sleep on their base-line nights, and these figures were used in the statistical calculations.

On consideration of the sleep pattern, the increase in percentage dream time on the second recovery night appeared to result from an increase in the frequency of the sleep cycle, rather than from increased dream duration or the earlier appearance of rapid eye-movements and dreaming owing to more pronounced lightening of sleep in the initial hours of the night.

2. Depth of Sleep

The depth of sleep as characterized by the EEG on the first recovery night was compared with that on the fourth base-line night, for each subject, adopting the criteria of five stages, "A" to "E", of increasing depth of sleep as defined by Loomis *et al.* (1937). Since the first recovery night was of greater duration than the fourth base-line night in all subjects, the final part of the night's sleep in excess of that on the base-line nights was not included in the analysis, so that total sleep times were equated.

The mean times spent in stages B, C, D and E were transformed to mean percentages of total sleep time, and the results are represented by Figure 1. It is clear that the decrease in time spent in dreaming in the B-stage, and also the decrease of C-stage sleep on the first recovery night, is made up by a corresponding increase in time spent in E-stage sleep, as compared with the fourth base-line night. On statistical analysis, the decrease in B-stage and increase in E-stage sleep were highly significant ($P < .001$) and the decrease in C-stage sleep significant ($P < .05$).

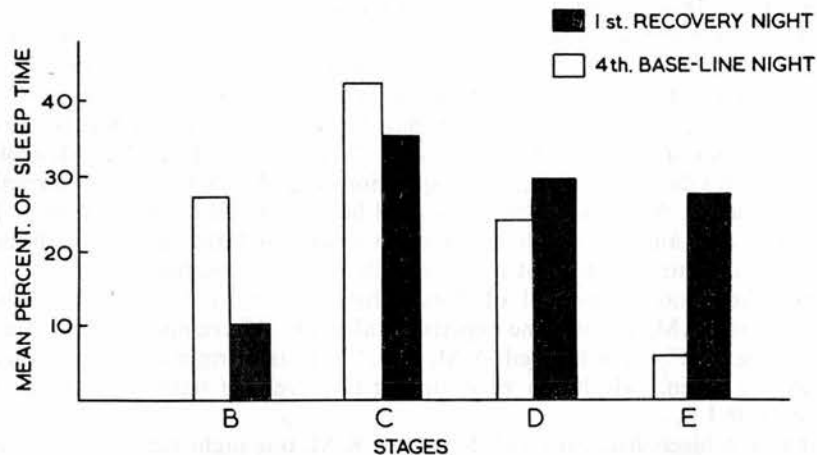


FIG. 1.—Mean percentage of total sleep time spent in Stages B, C, D and E on fourth base-line and first recovery nights. Note the increase in time spent in deep sleep (EEG stage E of sleep) following sleep deprivation.

3. "Psychotic" Changes During Sleep Deprivation

All subjects experienced changes of visual perception of surfaces. Wallpaper patterns seemed to move and flow, swirling vapour or cobwebs or shimmering bubbles seemed often to cover the floor, their hands, or the table, and one man once spent half a minute carefully kicking at the cobwebs which appeared to cover a carpet. Two saw crumbs on the table-cloth running about like insects.

Three had hallucinations of women peering at them. One (S.A.) had these experiences frequently after 60 hours, many being in broad daylight. The women were almost all unpleasant old women, who appeared to be talking about him. They would vanish (sometimes the body before the face) as he drew near, but after passing he saw them again when he turned round.

Sometimes the subjects addressed those present as if believing they were speaking to quite different persons, sometimes actually using the wrong name. On many occasions the subjects would speak or write what appeared to be dream contents. When given simple tasks such as addressing letters from a list, they made numerous mistakes (e.g., writing "West Looking" for "West Lothian"); or when asked to turn over all-night EEG recordings and write down the time every two minutes (i.e., every three double pages) they often wrote down absurd phrases instead of the time (e.g., C.S. wrote, "Batting by one", "cormial brier", "adorable"). While C.S. was working through an EEG record, he suddenly made the irrelevant remark, "Who to begin". Soon afterwards, he kissed the EEG paper. When asked about this, he said he must have been dreaming about his girl friend (who was currently denying him her hand in marriage). He was asked to write a description, but, as so often was the case, absurd elements quickly intruded. He wrote, "Leant forwards and downwards to plant a kiss upon the unmarried letters. £Coo hch". (Note the evident associations, EEG paper—letters—hch).

Each pair of subjects was sometimes sent on brief shopping errands by day. Once on return A.M. spoke at length to one of us about a "severe accident", and persisted on this theme despite replies. Speech tended to be rather mumbling on these occasions. When playing a card game in the night, A.M. remarked suddenly, "Too many schoolboys and schoolgirls working outside their school

lessons. It is a result of the decadence of this country . . . kill too many birds with one stone. Got to keep warm . . . grab my pubic hairs . . . go from one to the other." When questioned about all this, he muttered about "certain fleeces" and jumping from one hair to another. When asked on another occasion about a paint brush he was holding, he replied that the National Trust for Scotland were organizing an island visit. When J. D. said, "I can't find a towel", A.M. replied "Have you got diarrhoea?" Replies to questions would sometimes start normally, but finish oddly. A.M., describing this, said he felt his "own normal personality in conflict with another which seized upon some unrelated, irrelevant thought and gave voice to this thought in the middle of a conversation".

Another example typical of dream-thinking occurred when R.J.B. was chatting with A.M. about some experimental work. Where normally the phrase "first in the field" might be used, A.M. said, "That is all right so long as you are first on the green." He had a visual image of three golf balls on a green, one played by R.J.B.

Three subjects had paranoid delusions. K.M. one night behaved and spoke oddly for an hour and afterwards admitted that he had thought one of us (R.J.B.) was some sort of captor or interrogator. At the time, he spoke of R.J.B. as an "exquisitor", which he later explained meant to him an inquisitor able to inflict exquisite pain. A.M., when starting to play a card game, volunteered the statement that he intended to hire a bodyguard to protect him from "them". On being questioned about "them", he said, "They are the ones who caused all the trouble in the last year."

The most elaborate and firmly held delusions were those of A.L. After 96 hours of sleep deprivation, he experienced hallucinatory voices while a water tap was running. He turned off the water "to hear them better", but then they ceased. Later that morning he and S.A. went shopping with one of us (I.O.). Walking along a main street, A.L. was walking behind S.A., peering and pointing at the latter's jacket. He said he saw handwriting on it. A few minutes later he insisted on his companion taking off his jacket in the street (which he did) for a closer inspection. It was explained to him that such experiences occurred during sleep-deprivation. However, from that point on he elaborated a delusional system which he did not divulge till seven hours later and not fully till the next day, when he wrote nine pages of description.

It was planned that he and his companion should appear on the television that evening. He believed he must have been given a hallucinatory drug in order that he should have something interesting to recount on the television. He recalled that he had been told to drink up his mid-morning coffee before the shopping expedition and decided the drug must have been in the coffee. At lunch "we were put at a table well away from the rest . . . I said, 'What do they think we are, bloody pariahs?' I then thought I heard someone two or three tables away talking about the word pariah and its derivation. I decided that I must have been treated so that although I thought I spoke in a normal voice, I was, in fact, shouting. During the afternoon I was doubtful what I should do about this information I had, as I didn't want to tell . . ." When he saw I.O. speak to another doctor at a lunch-table, this was an indication that his realization of the drugging had been discovered. The waiter brought two jugs of water to his table, which indicated that further drugs had been administered in the table-salt and "I experienced a rather bitter taste in my mouth".

In the afternoon the subjects were left temporarily in the charge of a female secretary who was armed with several small shopping lists. After each errand, it was emphasized that they should return to her room. A.L. was very puzzled by

this, but concluded it was because the hallucinatory handwriting on the jacket was much clearer in the fluorescent lighting in that room. Once in this time he unsuccessfully sought I.O. out and once made an abortive attempt to telephone—in order to reveal that he knew about the drugs.

In the late afternoon I.O. handed some papers over to R.J.B. and wrote a pencil note on one. To A.L. this was a note stating that he had discovered about the drug. Later in the evening, however (see below) he concluded it must have been a message stating that his companion S.A. was mentally unbalanced. He was puzzled that I.O. did not acknowledge repeated hints that he (A.L.) gave to indicate his discovery.

They were driven to Glasgow in a television company car. A.L. felt very frightened, for R.J.B. was questioning S.A. about his dreams, and the realization dawned that R.J.B. was, in fact, a psychiatrist (and not a psychologist after all) who was taking S.A. away to lock him up after first hypnotizing him, for S.A. kept moving his limbs at the command of R.J.B. (actually this was to keep S.A. awake). A word-game was played to help maintain wakefulness, but A.L. (as he subsequently wrote) "was very wary of this because . . . of producing a word of special significance, like a Freudian slip". When given the word "train", he replied "Glasgow", for it instantly dawned on him that S.A. must be about to be locked up for having been responsible for the fires on the Glasgow electric trains withdrawn from service some months before.

He now became more frightened, for it dawned upon him that he and not S.A. was to be locked up. R.J.B. noted the strange, fixed stare on his face and received a large number of evasive and queer answers to questions ("discovering the unknown"; "the guilty one"; "the characters are different"). They reached the television studios, which A.L. took to be the hospital. He then confessed his fears and beliefs, was taken indoors and, when shown the cameras etc. his delusions seemed to evaporate. He was quite normal the next day after the first recovery night.

DISCUSSION

There are grounds for identifying the cyclical changes in depth of human sleep with similar but faster cyclical changes observed in the cat. In both species, rapid eye-movements occur when the EEG signs of light sleep appear together with irregular respiration and heart rate, and relaxation of skeletal musculature (Jouvet *et al.*, 1960; Berger, 1961). There is reason to believe that dreaming also occurs in cats at these times (Dement, 1958). The term "paradoxical phase" has been used to describe this phase of sleep, for it has special neurophysiological characteristics and has been called "hind-brain sleep" by Jouvet *et al.* (1960).

Following the original report by Dement (1960a), discussion (Ullman, 1960; Dement, 1960b) has centred upon the interpretation of Dement's findings from consideration of psychic or physiological mechanisms of stability. The observations of Dement (1960a) were explained by him in terms of dream deprivation. An explanation in terms of deprivation of the "paradoxical phase" of sleep would be one alternative. Another alternative was proposed by one of us (Oswald, 1962), but that alternative could not account for the results of the present work, which were contrary to our prediction, and which in fact were consistent with what would have been predicted if Dement's views had been accepted. It could be argued, of course, that sleep deprivation interferes with our acquired 24-hour rhythms so that sleep deprivation might be followed by a tendency to more light sleep and dreaming. In other investigations (Berger *et al.*

1962b), we have found clinical doses of barbiturates to reduce dreaming time. If this is true when barbiturates are taken over very prolonged periods, one would expect definitely adverse effects if dream deprivation were harmful, as Dement (1960a) suggests it to be. We are not, however, aware of serious harmful effects.

There seems little justification for arbitrarily isolating one psychic or physiological component of the total process and propounding a "need" for it. One might as validly propose that there is a "need for rapid eye-movements".

Our observations of increased depth of sleep following sleep deprivation are compatible with those of Marbach and Schaff (1960), who found a decrease of body movements during sleep following one night of sleep deprivation. However, observations during the paradoxical phase in cats, of elevated auditory thresholds (Dement, 1958); of raised threshold to reticular formation stimulation (Benoit and Bloch, 1960; Jouvet *et al.*, 1960), and behavioural arousal with EEG slow waves (Horovitz and Chow, 1961) to reticular formation stimulation, suggest the need for definitive criteria when using the terms "deep sleep" and "light sleep". Whatever the need for sleep in which dreaming occurs, our results demonstrate that deep sleep, in the more traditional EEG sense, takes priority after sleep deprivation.

A knowledge of the literature had not prepared us for such frequent psychotic features. These may well have been so much more apparent to us because the pairs of subjects literally lived continuously with one or other of us, whereas most other writers appear to have relied heavily on relays of nurses and other assistants to keep large groups of subjects awake, and the conclusions of Morris *et al.* (1960), for instance, were primarily based on a pair of clinical interviews with each subject. A sleep-deprived person can usually "pull himself together" sufficiently well to appear practically normal provided he has to do so only for a short period.

Sleep-deprived persons can maintain their cerebral vigilance at normal waking levels briefly, but there is an insistent downward drift of cerebral vigilance, accompanied by changes in thinking and perception comparable to those of dreams. Kraepelin (1906) wrote the most extensive paper on the peculiarities of dream-speech constructions and was intrigued by similarities to dementia praecox. It is remarkable that, while a great deal of interest has centred on drugs which produce experiences reminiscent of those described by schizophrenics, similar states produced without drugs by sleep deprivation alone have been comparatively neglected. The cases described here illustrate the verbal constructions of lowered cerebral vigilance, and how, as in the case of A.L., it is not necessary to give any drugs whatever to produce hallucinations and elaborate paranoid delusions.

SUMMARY

The EEG and eye-movements during nocturnal sleep were recorded from six males on four base-line nights and four recovery nights following 108 hours of sleep deprivation.

On the first recovery night there was a significant increase in the mean percentage of total sleep time during which EEG signs of deep sleep were present, associated with a significant decrease in the mean percentage of total sleep time spent in dreaming (determined by duration of rapid eye movement periods) on comparison with the base-line nights.

On the second recovery night there was a significant increase in mean dream time percentage compared with that on the base-line nights.

The results are discussed in relation to theories of a "need" for dreaming. Hallucinations, paranoid delusions and other abnormal behaviour during sleep deprivation are described.

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CHAPTER VI.

A PRELIMINARY APPROACH TO THE INVESTIGATION
OF THE EFFECT OF EXTERNAL STIMULI ON
DREAM CONTENT.

I had a dream which was not all a dream.

(Byron, Darkness.)

A. INTRODUCTION.

Previous studies of the effect of external stimuli on the manifest content of reported dreams have been reviewed by Ramsey (1953). These have been few and unsystematic. In every study, the subject was aware of the nature of the experiment and judgement of whether a stimulus had been incorporated into the dream events or not was totally subjective.

Dement and Wolpert (1958) were the first workers to record the EEG simultaneously with the introduction of external stimuli. Definite statements could therefore be made concerning the state of the sleeper coincident with the stimulus, and only those dreams (reported following awakening one minute after introduction of the stimulus) during which there were no EEG signs of awakening by the stimulus, were examined for incorporation of the stimulus. Dement and Wolpert estimated an auditory tone, a flashing light, and a spray of water to have been incorporated into the dream on about 10 per cent, 25 per cent, and 40 per cent of occasions, respectively. Incorporation was considered to have taken place if a sound, manifestation of light, or falling water was appropriately recalled in the dream. The frequencies of incorporation of the stimulus into the dream events were arbitrarily arrived at without taking into account the expectancies of the subjects dreaming of such events by chance alone, or of comparing the above series of dreams with a control series of dreams during which no external stimuli were introduced. However, the auditory tone and flashing light, which are relatively meaningless stimuli, in the sense that they could be associated with a wide variety of dream events, were not judged to be incorporated so frequently compared with the water spray

which had fewer associative connections. On the other hand, the water spray was a more intense stimulus, in the respect that it led to a larger number of awakenings, and the effectiveness of this stimulus could be attributed to the causation of a higher level of arousal than the other two stimuli. It would be reasonable to expect a higher level of arousal to lead more often to some form of awareness, although non-veridical, of the stimulus.

Dement and Wolpert (1958) found the interval between introduction of external stimuli and awakening to correspond closely with the time taken up by the dream action following the incorporated dream event until the end of the dream, failing to confirm the many anecdotal reports of compression of dream events into a short space of "real" time following accidental awakenings by external disturbances (e.g. Maury, 1953).

Which characteristics of an external stimulus determine whether or not it will be incorporated into the dream events, and by what process does incorporation take place? Those questions have not been systematically considered in past studies. Various external stimuli have merely been picked at random without regard to their qualities, or meaning to the sleeper. It seems obvious that a certain threshold intensity of the stimulus is necessary in order to enter the awareness of the sleeper, and recent studies have shown discrimination between stimuli to be possible during sleep. Rowland (1957) reported slower habituation of the EEG arousal response in sleeping cats to a 25 clicks per second stimulus, which had previously been followed by electric shocks during wakeful trials, than to a 240 cycles per second tone. Rowland also stated (without details) that finer discriminations

between 384 c/s and 480 c/s were possible. Oswald et al., (1960) demonstrated that humans in G stage sleep were able to discriminate between meaningful verbal stimuli. Spoken personal names were repeatedly played from a magnetic tape every few seconds to sleeping subjects. K complexes and an operant response were more likely to be evoked by the subjects' own names than by other names.

Analagous results have been obtained from studies of wakeful subjects. Howarth and Ellis (1961) found lower thresholds for intelligibility of subjects' own names compared with other names, when both were accompanied by an interfering background noise; and Moray (1959) found that the 'block' set up in the 'rejected ear' during dichotic listening could be penetrated by the subject's own name.

Oswald et al., (1960) suggested that failure to respond to a stimulus may be due to non-activation of arousal mechanisms following cortical analysis of the stimulus characteristics, rather than peripheral blockade of sensory inflow mediated by centrifugal fibres, as the findings of Hernández Peón et al., (1957) had previously suggested.

B. THE PRELIMINARY EXPERIMENTS.

The preliminary experiments will be briefly described, to indicate the problems encountered before a reliable technique was devised by which verbal stimuli could be introduced while REM periods were in progress without awakening the subject. A variety of verbal stimuli were used in order to explore their mode of incorporation, if any, into the dream events prior to selection of specific stimuli to be used methodically in the main experiments;

the forms in which some of these stimuli were later found to be unmistakably incorporated in the dream events were completely unanticipated prior to the preliminary experiments. Basically, three experimental procedures were employed during the evolution of the method adopted in the Main Experiment.

The Initial Procedure.

The subject, a male student volunteer aged 19, was informed, in a general way, that the purpose of the experiment was to investigate the effect of auditory stimuli on dream content.

The EEG, eye movements, and galvanic skin response (GSR) were recorded throughout two nights of sleep. Whenever a REM period was in progress, attempts were made to play to the subject, over a loudspeaker placed beside his bed (and which was also used for intercommunication), his own name (spoken by a female voice), or the name of one of his current or previous girl friends (male voice), or emotionally charged words or phrases (male or female voice). The girl friends' names were obtained during initial interview and the stimuli recorded separately on loops of magnetic tape.

It was found that the subject invariably awakened to the stimulus, even when the stimulus was played at extremely low levels, and in each instance he reported hearing the stimulus correctly. The administration of barbiturate in the hope that it might raise the auditory threshold was considered, but the possibility of the processes of dream thinking being altered by drugs could not be excluded.

The subject also displayed a remarkable sensitivity to disturbances external to the bedroom which had not been observed so

markedly in normal subjects during previous experiments. It therefore seemed probable that this susceptibility to external noises reflected the subject's expectancy of being stimulated during the night. Zung and Wilson (1961) reported that, in all stages of sleep, motivated subjects could awaken specifically to certain chosen stimuli.

It was therefore decided to conceal the nature of the experiment from future subjects and the present subject promised not to disclose the nature of the experiment to any other persons, submitting no more details than, "it was to do with dreams".

Second Procedure.

The subjects, two male student volunteers, were told that the purpose of the experiment was to investigate the content of dreams and that no further details could be given since, for obvious reasons, the content of subsequent dream reports might be prejudiced. A specious explanation of the reasons for recording of GSR's while reading out aloud a list of girls' names and words (which was for the purpose of selecting stimuli having no emotional significance to the subject, and will be fully described with the main experiment) was given; to the effect that it was "to test your emotionality".

No dreams were elicited from the first subject, aged 19, following four awakenings during two nights of sleep, owing to failure of recall (the only instance encountered of such poor recall; dreams might have been obtained on further nights with sufficient perseverance).

It was possible to introduce the stimuli at low levels during REM periods, without the subjects awakening. However, the stimuli

had to be introduced without repetition, with relatively long intervals of 30 to 50 seconds between them, since the EEG usually indicated arousal with presence of alpha rhythm for a few seconds following the stimulus, before returning to the B stage (Figure II) and was sometimes accompanied by a GSR.

The second subject (B.T.), aged 21, was studied for four nights of sleep. On the first night, he recalled one dream bearing no apparent connection to the stimulus played during the associated REM period. Towards the end of the second night, following two awakenings without dream recall, a REM period commenced at 6.44 a.m.; 4 minutes later, the stimulus 'Catherine' was introduced once, and repeated once more 2 minutes later. The REM period was allowed to continue for a further 4 minutes and the subject awakened by a high frequency tone played at high volume over the loudspeaker. He recalled a dream (given in full in Appendix B, Transcription No. 1) in which his landlady, Mrs. Cameron, appeared towards the end of the dream, immediately following a conversation with a friend about a previous girl friend "who's figured in my life as a sex partner". Catherine was also a previous girl friend of his whom he had mentioned during the initial interview describing their relationship as being "primarily sexual". This association and the assonance between the stimulus 'Catherine' and Mrs. Cameron suggested that incorporation of the stimulus into the dream had taken place.

On the third night, the stimulus 'Morag' was introduced once, 8 minutes following the onset of a REM period, and again 2 minutes later, at increased volume; 3 minutes later B.T. awakened spontaneously. The subject recalled a dream (Appendix B, Transcription No. 2) in which he was "at the top of a wind-swept moor",

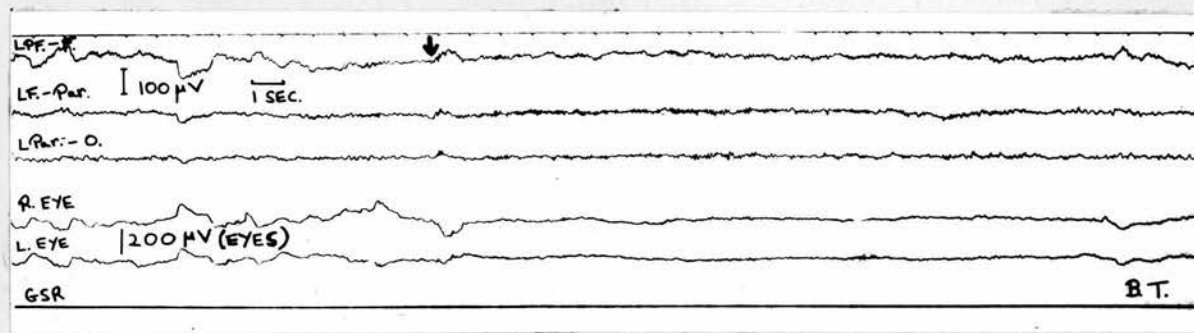


Figure II.

An example of appearance of alpha rhythm in the EEG following a single stimulus presentation (indicated by the arrow), with return to B-stage sleep 20 seconds later.

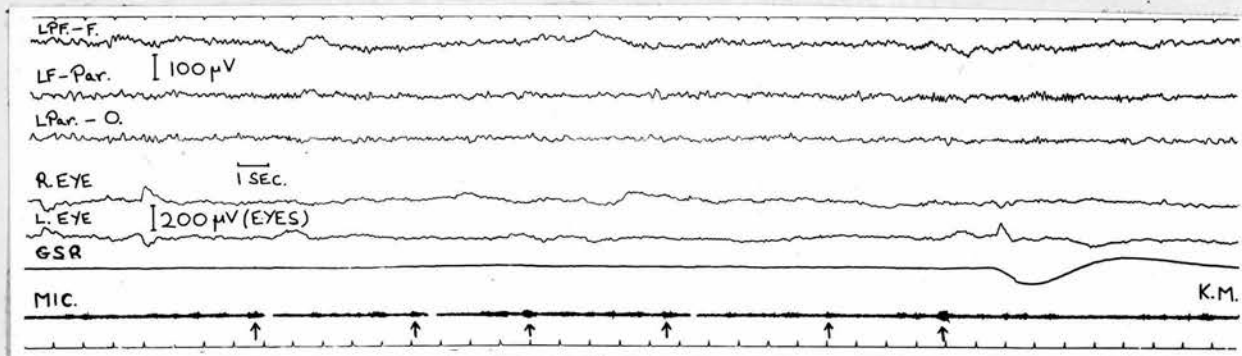


Figure III.

Repetitive presentation of the stimulus (indicated by arrows) over the "white noise" background. A DC shift and high frequency components are evoked in the EEG by the initial stimulus presentation and alpha rhythm accompanied by a GSR follow the final presentation.

and a village tobacconist was being questioned "on what various road-signs meant . . . it seemed to be connected with the war". Assonant connection was here again present between the stimulus 'Morag', which was the name of his current girl friend, and dream events.

No further examples of probable incorporation of stimuli were obtained from this subject; a total of 8 dreams having been elicited.

It was decided to modify further the technique used, owing to the relatively low thresholds of the subjects to stimulation, such that the stimuli could not be presented repeatedly during REM periods.

Third Procedure.

A masking background of "white noise", varying in intensity, was played continuously over the loudspeaker at a comfortable level from the time when the subject retired to bed and throughout subsequent sleep. It was hoped that habituation to changes in stimulus intensity would generalise, to some extent, to the verbal stimuli. The increase in signal to noise ratio by introduction of the white noise also allowed the verbal stimuli to be played at higher levels, variations in intensity not being so critical as before.

Under these conditions, a 21-year-old male student volunteer (K.M.) fell asleep within 30 minutes of retiring to bed (he had restricted his sleep to a total of 6 hours the previous night).

It was possible to play the stimulus repetitively at 4-6 second intervals without awakening the subject, although arousal was clearly displayed by the EEG, with occasional evocation of GSR's, (Figure III). Towards the end of the third REM period, at the end of the night, the name 'Reba' (an ex-fiancée of K.M.) was played

repetitively 26 times (male voice). K.M. recalled a dream on awakening in which he had been having "an angry word" with a girl dressed in white, "sort of Regency clothes (Appendix B, Transcription No. 3).

On the second experimental night, K.M. awakened to each presentation of the stimulus during three successive REM periods. He reported hearing my voice several times during the night, previous to hearing the stimulus 'Reba' correctly on the final awakening. When asked to volunteer an explanation, K.M. concluded that names were being played to him while he was asleep, which had been used to test his GSR's, in order to influence his dreams. He had arrived at this conclusion following the first experimental night during which he had heard nothing, thinking it to be an adaptation night to accustom him to the "white noise". His curiosity had not been satisfied concerning the purpose of the experiment and he had considered several possibilities before arriving at the correct conclusion, which manifested itself by such a marked decrease in threshold of awakening to the stimulus. This marked alteration in behaviour supported the hypothesis proposed above that expectation of hearing a stimulus during sleep would lead to a low threshold of awakening, relating to the failure of the initial procedure in which the subject was informed of its nature.

K.M. was rejected for further study and he agreed not to divulge the nature of the experiment to other persons.

It was decided to provide a specious explanation of the purpose of the experiment for future subjects.

The results at this stage suggested that incorporation had probably taken place in three dreams, the dream thoughts bearing an assonant connection with the stimulus. It was decided to embark

upon a controlled experiment in which subjective bias during analysis of the dreams, and subjective establishment of tenuous connections between the stimulus and dream events, could be eliminated.

CHAPTER VII.

THE EXPERIMENTAL MODIFICATION OF
DREAM CONTENT.

We shall not be surprised to find that, for the purpose of representation in dreams, the spelling of words is far less important than their sound, especially when we bear in mind that the same rule holds good in rhyming verse.

(Freud, 1954.)

The primary aim of the experiment was to determine whether emotional and neutral names played during REM periods would be incorporated into the dream events, and to investigate the manner in which any such incorporations took place.

The opportunity was also taken of comparing the frequencies of galvanic skin response (GSR) to the emotional and neutral personal names; of determining the frequency of recall of colour in dreams; and of studying the relation between the amount of rapid eye movement activity during dreaming and the nature of the dream (which has been described in Chapter III).

A. THE INITIAL HYPOTHESIS.

In the light of the study by Oswald et al., (1960), and the preliminary experiments, the hypothesis was proposed that during dreaming continual cortical analysis of environmental stimuli takes place, and that those stimuli which are potentially arousing (by virtue of their significance to the sleeper) are experienced as belonging to dream, but are misperceived in such a way as to be compatible with the natural progression of the dream events.

This hypothesis led to the following predictions:

1. That the subjects themselves and an independent judge familiar with the dreaming process would be able to select the correct stimulus name associated with each dream from a group of four stimuli (randomly presented during each successive REM period for each subject) more often than would be expected by guessing correctly by chance alone.
2. That there would be a significant difference between the number of correct matchings of neutral and

emotional stimulus names, with emotional stimulus names being chosen correctly more frequently.

B. THE SUBJECTS.

The subjects were 4 male and 4 female normal volunteers. During the initial interview, a short personal history was obtained. Questions were put verbally in as relaxed and informal a manner as possible, following in outline the questionnaire given in Appendix B. Most of the questions were concerned with the subjects' impressions of the quality and pattern of their sleep and dreams, being included primarily to draw attention away from critical questions pertaining to the names of current and past friends of opposite sex to the subject (all subjects being single).

A short description of each subject is given below, together with the two names which were among the four verbal stimuli used in the experiment, and a brief description of the relationship between the subject and the persons bearing the names.

Subject P.M.

Male, aged 23. Second eldest child with four brothers and three sisters. Fourth year medical student.

Girl friends: No current girl friends.

Jenny - Lasted two years and ended the previous year.

Elfriede - A German. Lasted 8 months when subject aged 18.

Relationship with both "more emotional than sexual", strongest with Elfriede.

Subject C.S.

Female, aged 21. An adopted child. No other children in adopted family. General Arts student.

Boy friends: Leslie - An Indian. Initially claimed to have "none at present" but later admitted him to be her current boy friend whom she had known for about a year.

Norman - Lasted six months when aged 17.

Relationship was not strongly emotional with either; had never had a strongly emotional relationship with a boy. A certain amount of conflict was evident over having an Indian boy friend.

Subject G.M.

Male, aged 20. One elder brother. Psychology student.

Girl friends: Rosemary - Current girl friend for six months. Relationship "steady but not vital", not very strong sexually or emotionally.

Gillian - Lasted $2\frac{1}{2}$ years prior to commencing at University.

Relationship "serious but did not want to become involved". Strongest sexually.

Subject P.H.

Female, aged 21. One sister and two brothers. Graduate chemical research assistant.

Boy friends: Andrew - Current boy friend.

Relationship "jogs along" for $1\frac{1}{2}$ years, not platonic but not so intense as with Mike.

Mike - Lasted one month a year previously. Relationship had a "sexual overlay".

Subject K.F.

Male, aged 20. Two brothers and one sister. Third Year General Arts student.

Girl friends: Maureen - Current girl friend for one month. Relationship "fairly casual" with "sex pre-dominant".

Liz - One of a series of passing girl friends. About one year previously.

Subject R.H.

Female, aged 19. One younger brother. Maths and Psychology student.

Boy friends: No current boy friends.

Edward - Lasted 6 weeks two months previously.

Sandy - Previous summer "on and off for 6 weeks".

Relationship more emotional than with Edward but no sex involvement with either.

Subject E.S.

Female, aged 20. One brother and one sister. Third Year General Arts student.

Boy friends: Kenny - Subject K.J. Had known each other for 3 years and had been going out for 2½.

Relationship strongly emotional "with sex element".

Chris - During first year at University. Had a "crush on him" but did not go out with him.

Subject K.J.

Male, aged 21. Only child. Mechanical engineer.

Girl friends: Eileen - Subject E.S. (see above).

Gillian - Lasted 9 months five years previously.

First "big relationship". "Platonic
on the surface".

C. INSTRUCTIONS.

If the subject, following interview, was considered suitable for the experiment (one volunteer who claimed to be a light sleeper and one girl who had had no boy friends were rejected), the following instructions were given to the subjects:

"The aim of this experiment is to study the possible relations between dreams occurring on the same night.

You will be required to fall asleep in the presence of "white noise" played at low varying volume through a loudspeaker beside your bed. This "white noise" is a continuous hissing noise, and its purpose is to try to mask random external noises which might occur outside the bedroom and possibly influence the dream. Several times during the night, you will be awakened in the middle of a dream and I should like you to recall and narrate them to me as fully as you can without keeping anything back because you might find it embarrassing. Should any of the dreams be published or presented in any way to the public, you will in no way be identified personally as the originator of the dream."

D. SELECTION OF THE STIMULI.

GSR's were recorded from the palm of the hand, with the subject sitting relaxed and with eyes closed in a comfortable armchair. A list of neutral and emotionally-charged words was read aloud to the subject, followed by a list of personal names of opposite sex to the subject which included the names of current and past boy or girl friends which had been obtained during the initial interview. An explanation of the above procedure to the effect that it was "to test your emotionality" was given to the subjects.

All but one (subject K.F.) of the subjects exhibited GSR's to at least two of the names of current or previous boy or girl friends. Of these, the two names selected were either the name of the current friend and the name of a previous friend which evoked a GSR of greatest amplitude, or the names of two past friends (if there was no current friend) which evoked GSR's of greatest amplitude.

From those names which provoked no GSR and, as far as could be known, did not belong to any friend or sibling of the subject, were chosen the two neutral names. They were selected, as far as was possible, to be equal in number of syllables and of maximum contrast in sound to each of the emotional names. The choice when considering the above variables was necessarily limited owing to the length of the list of names read out aloud having to be curtailed in order to avoid habituation.

Figure IV shows sections of recordings from two subjects in which GSR's followed the emotional names, and a flat trace followed the neutral names, which were selected as neutral stimuli.

Equal lengths of magnetic tape, on one track of which had been recorded "white noise" varying in volume, were cut and the ends

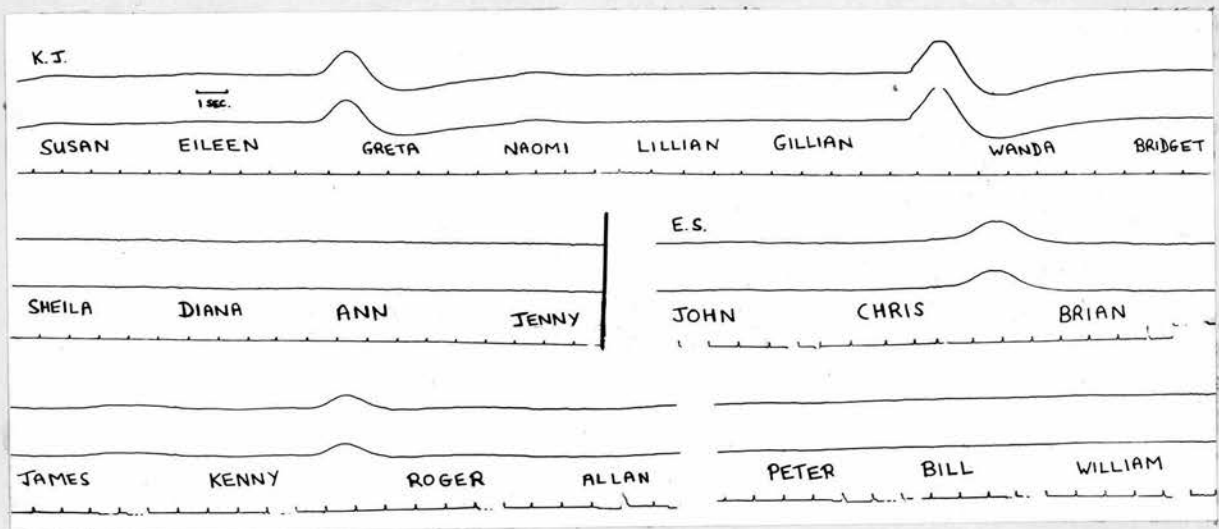


Figure IV.

Excerpts of recordings of palmar skin potential (two identical channels were used in order to detect brief machine-induced drifts) from two subjects. GSR's follow the emotional stimulus names 'Eileen' and 'Gillian', for K.J.; 'Chris' and 'Kenny' for E.S. The trace remains flat following the names 'Naomi' and 'Diana' for K.J.; 'John' and 'Peter' for E.S., which were ultimately selected as neutral stimuli.

spliced together to form four loops for each subject. Using a twin-track tape recorder, the stimulus name was recorded on the second track of each loop. Names played to female subjects were spoken by a ^{fe-}male voice and those played to male subjects spoken by a male voice. The names were spoken with somewhat unnatural clarity, with equal emphasis on each syllable as far as was possible. The length of the loops was such that four repetitions of the name were recorded on each loop at approximately 4 second intervals and this interval maintained on playback over the joint in the tape.

E. THE EXPERIMENTAL METHOD.

In order that the subjects would be sleepy on the first experimental night, they were requested to restrict their sleep at home on the preceding night as much as possible, and to take at the most six hours. The subjects reported to the laboratory each night (which were non-consecutive, in order to allow them to recover from the effects of interrupted sleep [Dement, 1960], not to mention the experimenter) about one hour prior to their usual bedtime.

Silver cup electrodes were affixed to the scalp with collodian, and to the surface of the facial skin with sticking plaster. The EEG was recorded from a prefrontal and an anteroposterior chain of electrodes; eye movements from the prefrontal electrode and an electrode below the outer canthus of each eye; and GSR's from electrodes placed over the palm of the hand and the dorsum of the ipsilateral forearm.

When all the electrodes had been attached, the subjects retired to bed and fell asleep to the accompaniment of the "white

noise" background played at a comfortable level (for details see Appendix B) over a loudspeaker placed beside the subject's bed from the lower track of the particular loop of magnetic tape. The presentation of the stimuli and any other incidental noises occurring throughout the night were recorded over the repeating pattern of "white noise" from a microphone placed in front of the loudspeaker (its presence was explained to the subject as being to indicate the time of awakening to a high frequency tone). However, it proved to be rather insensitive and presentation of the stimuli was also recorded by using a stimulus marker (which is reproduced in the Figures, the channel from the microphone being omitted).

Approximately 5 to 10 minutes after the onset of each REM period, the stimuli were introduced by turning up the gain control of the amplifier whose input was fed from the top track of the tape loop on which the stimulus name had been recorded. The outputs of both amplifiers of the twin-track tape recorder fed into the loudspeaker beside the bed so that by this method no clicks were produced which might have aroused the sleeper. Owing to individual variations and constant fluctuation of the arousal threshold during sleep, the stimuli could not be presented at a constant level to all subjects or at all times for the same subject. As a general rule, the stimuli were played at such a level as initially to provoke a just discernible change in the EEG, usually in the form of flattening of the EEG trace or of "humping" (representing a DC shift in cortical potential); or of a low voltage rhythm of high frequency continuing for one or two seconds; or on rare occasions of a brief appearance (1 to 2 seconds) of alpha rhythm (Figure V). The stimuli were allowed

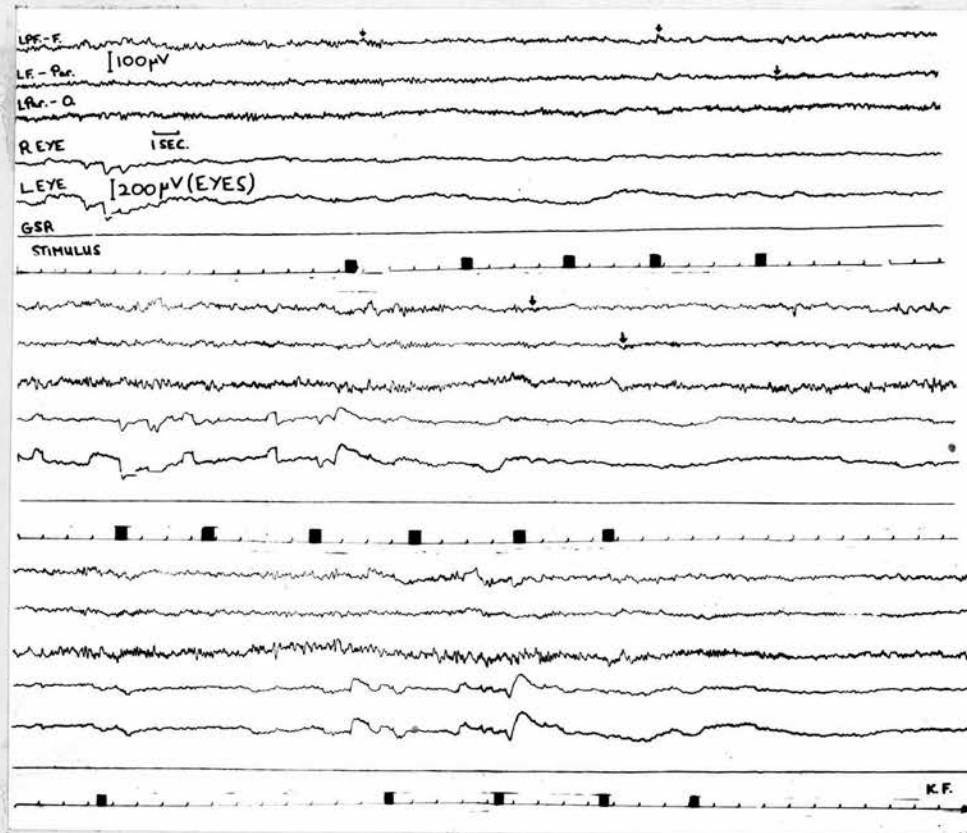


Figure V.

Examples of EEG responses to stimuli. All three excerpts are of recordings from subject K.F. The arrows indicate DC "humps" following the first and fourth stimuli in the top excerpt and rhythms of high frequency in response to the final stimulus in the top excerpt and the last two stimuli in the middle excerpt. Momentary appearances of alpha rhythm are seen to follow three stimulus presentations in the bottom excerpt.

to continue for a dozen or so repetitions if the subject remained relatively unresponsive but more often were introduced singly or in groups of from two to six repetitions. If marked arousal was evident, as manifested by continuous alpha rhythm for a duration of more than two seconds, often accompanied by a GSR, the gain control was immediately turned down to zero and the stimulus reintroduced when the EEG had returned to a continuous B stage pattern. Owing to such moment to moment variations in the level of arousal, a constant number of repetitions and pattern of stimulation could not be maintained for all REM periods, but the number of repetitions was generally of the order of a dozen, and variations in number and pattern of stimulations tended to be randomly distributed. Approximately 20 seconds following cessation of the stimulus, the sleeper was awakened by playing a high frequency tone over the loudspeaker (produced by a feedback circuit) and dream recall elicited. The dream reports were recorded on magnetic tape from another microphone attached to the subject's bed above his head leading to a second tape recorder in the experimenter's room.

Questioning during elicitations of dream reports was kept to a minimum without undue focussing on any particular aspect of the dream and, as far as possible, a similar pattern of questions was maintained throughout the study. It was not possible to adopt a standard dream questionnaire owing to the fragmented and incoherent nature of the dream sometimes demanding elucidation and persistence on the part of the experimenter until the required information was rendered or part of the dream "came back" to the subject. Occasionally, just as the enquiry was on the point of being terminated, a vital part of the dream was recalled. If the subject

did not spontaneously report an experience of colour in the dream, he was questioned on this point at the end of the enquiry.

Following termination of the enquiry, the subjects were allowed to fall asleep again as before, until the next REM period when the procedure was repeated, apart from the random presentation of the four stimulus names.

A total of about 10 dreams was elicited from each subject during 4 to 6 nights of sleep (one to four dreams were recalled each night except for the fifth night of subject R.H. during which no REM's occurred), making a total of 38 nights of sleep for the whole group. Awakening from REM periods was carried out on 103 occasions and dream recall occurred on 89 instances, representing a frequency of recall of 86.4 per cent, which is of the same order as that found by other workers (see Chapter I). An approximately equal number of dreams were recalled following presentation of emotional and neutral stimulus names.

The subjects were only rarely awakened by the stimulus despite the large number of presentations. On two occasions, subject G.M. reported hearing a voice (which he attributed correctly to the experimenter) following awakening by the stimulus. Once he reported hearing 'Gillian', which was in fact the stimulus name presented (Appendix B, Transcription No. 32),^{*} and on another occasion, he claimed to have heard a spoken name of similar length and probably beginning with 'D' following presentation of the same stimulus (Transcription No. 34). On one occasion, subject P.H.

* Full transcriptions of the recorded dream reports are given in Appendix B. All further references to dreams will be given by the appropriate transcription number alone.

veridically perceived the stimulus name 'Andrew'. Following each of these incidents, the subjects appeared to be convinced by an explanation that they must have misperceived noises occurring outside the bedroom or voices in the nearby corridor. At the conclusion of the series of nocturnal sessions, each subject was asked whether he or she had any further impressions or ideas to submit concerning the purpose of the experiment, other than what they had been told in the initial instructions. Not one subject volunteered an explanation which bore any relation to the true nature of the experiment, including subject G.M. who had suspected that names were being played to him in order to influence his dreams following awakening by the stimulus 'Gillian'. A typical example of a subject's post-experimental impressions is given in Appendix B. On other occasions, subjects reported hearing a voice repeating a name or phrase (e.g. Transcription Nos. 15, 63, 75, 76) but they clearly treated these experiences as part of their dream. All subjects appeared surprised when the nature of the experiment was finally revealed to them.

F. ASSESSMENT OF THE RESULTS.

In a study by Dixon (1958), the subjects were reported, following free associative responses to "subliminal stimulation", to be capable of matching their responses with these same stimuli presented "supraliminally". It was decided to adopt a similar method in the present study in order to assess whether subjects were capable of matching the correct stimulus name which had been presented during the REM period with its associated dream.

When all the nocturnal sessions had been completed for the whole group, the subjects were called back individually and the

following instructions read aloud to them:

"The purpose of the experiment was to compare the effects of emotional and neutral verbal stimuli on dream content.

"During the experiment, each time that you were dreaming, you were stimulated towards the end of the dream randomly with a male/female voice repeating one of the following names . . . (the four names given) . . which I shall play for you to hear in a few minutes.

"I should like you now to listen to the tape recordings of your dream reports one at a time and after each one tell me which name you think you were stimulated by during the dream. The type of connection to look for is between the dream content and the sound of the name . . . (two examples given) . . . or any other you may think fit. Pay particular attention to things that appeared significant, striking or strange to you at the time of recall, your first words after being awakened, and the content towards the end of the dream when you were being stimulated.

"If you can see no apparent connection between any of the names and the content of the dream, then make an intuitive or random guess."

The two examples of apparent incorporation of the stimulus into the dream which were given to them were, of course, obtained from other subjects, and incorporations which appeared to involve an assonant connection between the stimulus and the dream events.

To illustrate: the dream of subject P.M. (Transcription No. 6) in which he was opening a safe with a jemmy which he recalled

following awakening from a REM period during which the name of his girl friend, 'Jenny', had been played, might have been given as an example; or that of subject R.H., who, following presentation of the name 'Robert', reported dreaming of "a rabbit in a film" which "was slightly frightened and distorted", (Transcription No. 62).

The four stimulus names followed by the recordings of each subject's dream reports were then played to them as they lay in the darkened bedroom where they had previously slept. The subjects then chose the one of the four stimulus names, following playback of each dream, which they considered to bear the closest relation to the dream. If at any time during this matching session they wished the stimulus names to be played back again, for the purpose of retaining the pronunciation of the names in their minds, this was done. They were also asked to state whether they considered their choice to be based upon a connection between the stimulus and the dream events or whether it was a guess. Those dreams with which the subjects had reported hearing the stimulus were not included in this analysis.

It could be argued that should the subjects choose the correct stimulus name significantly more often than expected by chance (which was in fact the case [see Results]), this might be due to their having heard the stimulus names during the experiment but, for various reasons, not reporting it. Or alternatively, during "paradoxical sleep", the stimulus names might have become associated with the dreams as a result of a complex conditioning process without directly influencing the content of the dream, and that the subjects were selecting the correct stimulus by

virtue of such a process. To act as a control for such an interpretation, and as an independent estimation of the effect of external stimuli on the dream, an independent judge (my colleague, Dr. Ian Oswald), who was thoroughly familiar with the singularities of dream thinking, was presented with essentially the same task.

The tape-loops on which were recorded the stimulus names, tape recordings and typewritten transcriptions of the dreams; and a short history of each subject (as given above) were made available to him. He was already acquainted with the forms of incorporation which had apparently occurred during the preliminary experiments but had no prior knowledge whatsoever of which stimuli were associated with each dream, not having been present during any of the nocturnal recording sessions. The following notes, concerning those contents of the dream to which particular attention should be made when making his judgements, were given to him:

1. First words of the subject on being awakened.
2. Things which appeared striking, significant or strange to the subject.
3. Change in the ethos of the dream.
4. Lists of objects, words or names. Or a number of same.
5. Conversation.
6. Clang associations.
7. Other associations.
8. Time relationships between stimulus and events in the dream, although the validity of the subject's estimation of the order in which the events or dream scenes occurred should not be relied on.
9. The possibility that a previously/^{un-}recalled dream be recalled at a later awakening, or that a dream from which the subject had not been awakened be recalled later.

Accompanying each dream transcription was a diagrammatic representation of the time of onset and duration of the associated rapid eye movement period; the number of repetitions, and the pattern of presentation of the stimulus; and the times and duration of spontaneous awakenings, interspersions of C stage sleep and external incidental noises (e.g. passing cars, motor cycles, etc.). The relevant parts of those transcriptions in which subjects referred to being awakened by the stimulus were covered up and the tape recording stopped prior to that point, the transcriptions alone being available for the remainder of the dream report. Knowledge of results was given following the series of matchings for each subject and performance was found to improve by adopting this method, since interest was maintained and motivation increased. The independent judge rated his choices according to three categories of decreasing confidence of being correct (I, II, III), and a fourth 'guess' category (G). He was asked to give reasons for each choice other than when he made a guess.

G. RESULTS.

The results are presented in Tables 1 and 2.

1. Matchings performed by the Subjects.

The subjects correctly matched the stimulus name which was presented during the associated REM period with 36 out of the total of 86 dreams, performing significantly better than a chance expectancy of guessing the stimulus name correctly for one dream in four ($\chi^2 = 13.04$, $P < .001$, $n = 1$).

Eight of the above total of dream reports were extremely brief. In seven of these, only a fragment was recalled such as a single

TABLE 1

Matchings of stimulus names with dreams by
subjects and independent judge

The confidence level at which each matching was made is given in parentheses after each selected stimulus name (see text).

Subject	Transcription No.	Stimulus	Subject	Matching Independent Judge
P.M.	4	Jenny	-	Laura (III)
	5	Elfriede	-	Elfriede (III)
	6	Jenny	Jenny (G)	Jenny (I)
	7	Shirley	Laura (G)	Shirley (II)
	8	Laura	Shirley (G)	Elfriede (III)
	9	Shirley	Shirley (G)	Laura (II)
	10	Laura	Laura (G)	Elfriede (G)
	11	Jenny	Elfriede (C)	Shirley (III)
	12	Laura	Shirley (G)	Laura (III)
	13	Jenny	Shirley (C)	Jenny (II)
	14	Elfriede	Laura (G)	Elfriede (III)
	15	Shirley	Shirley (C)	Shirley (I)
C.S.	16	Leslie	Leslie (C)	Leslie (III)
	17	Michael	Norman (G)	Peter (II)
	18	Peter	Peter (C)	Peter (I)
	19	Norman	Michael (G)	Leslie (III)
	21	Peter	Michael (C)	Michael (II)
	22	Michael	Peter (G)	Leslie (III)
	23	Norman	Peter (C)	Peter (I)
G.M.	24	Gillian	Rosemary (C)	Rosemary (II)
	25	Diana	Diana (C)	Diana (II)
	27	Rosemary	Gillian (C)	Gillian (II)
	28	Shirley	Shirley (C)	Rosemary (III)
	29	Diana	Rosemary (C)	Rosemary (III)
	30	Rosemary	Gillian (G)	Gillian (II)
	31	Shirley	Shirley (G)	Diana (III)
	33	Rosemary	Rosemary (C)	Shirley (III)
	34	Gillian	Shirley (G)	Gillian (III)
	35	Shirley	Shirley (C)	Shirley (II)
	36	Diana	Gillian (G)	Rosemary (II)
	37	Gillian	Rosemary (G)	Diana (III)
	38	Rosemary	Diana (G)	Gillian (G)
P.H.	39	Richard	Andrew (C)	Andrew (II)
	40	Andrew	John (C)	Richard (II)
	41	John	Mike (C)	Mike (II)
	42	Mike	Mike (G)	Andrew (I)
	43	Andrew	-	John (III)
	44	John	John (C)	John (III)
	45	Richard	Richard (G)	Richard (G)
	46	Mike	Mike (G)	Mike (II)
	48	John	Andrew (G)	Richard (III)
	49	Andrew	John (C)	Mike (III)
K.F.	50	Sheila	Sheila (C)	Carol (II)
	51	Maureen	Carol (C)	Sheila (III)
	52	Carol	Liz (C)	Liz (I)
	53	Maureen	Maureen (C)	Maureen (III)
	54	Liz	Carol (G)	Maureen (III)
	55	Sheila	Liz (C)	Liz (II)

56	Carol	Sheila	(G)	Sheila	(III)
57	Maureen	Maureen	(C)	Maureen	(III)
58	Liz	Maureen	(C)	Maureen	(III)
59	Liz	Liz	(C)	Carol	(II)
60	Sheila	Sheila	(C)	Sheila	(I)
61	Carol	Carol	(C)	Carol	(I)

R.H.	62	Robert	Robert	(C)	Robert	(II)
	63	Sandy	Sandy	(C)	Sandy	(I)
	64	Michael	Robert	(G)	Robert	(II)
	65	Edward	Sandy	(G)	Michael	(III)
	66	Michael	Edward	(G)	Edward	(I)
	67	Robert	Robert	(G)	Sandy	(II)
	68	Edward	Michael	(G)	Edward	(II)
	69	Sandy	Sandy	(C)	Robert	(III)
	70	Michael	Sandy	(G)	Sandy	(III)
	71	Edward	Michael	(G)	Sandy	(III)
	72	Sandy	Edward	(G)	Robert	(III)

E.S.	73	Peter	Kenny	(C)	Chris	(II)
	74	Kenny	John	(C)	John	(I)
	75	John	John	(C)	John	(I)
	76	Peter	Peter	(C)	Peter	(I)
	77	Chris	Chris	(C)	Chris	(II)
	78	Chris	Kenny	(C)	Kenny	(I)
	79	John	John	(C)	John	(I)
	80	Kenny	Chris	(C)	Chris	(II)
	81	Kenny	John	(C)	Kenny	(III)
	82	Chris	Chris	(C)	Peter	(III)
	83	Peter	Peter	(G)	Peter	(III)
	84	John	John	(C)	John	(II)
	85	Kenny	Chris	(G)	Chris	(II)

K.J.	86	Diana	Eileen	(G)	Naomi	(II)
	87	Eileen	Eileen	(C)	Eileen	(I)
	88	Eileen	Diana	(G)	Diana	(III)
	89	Gillian	Naomi	(G)	Gillian	(III)
	90	Gillian	Gillian	(C)	Eileen	(II)
	91	Naomi	Eileen	(C)	Naomi	(I)
	92	Naomi	Diana	(G)	Diana	(III)
	93	Diana	Eileen	(G)	Gillian	(III)
	94	Gillian	Gillian	(G)	Gillian	(I)
	95	Eileen	Eileen	(G)	Eileen	(I)
	96	Naomi	Diana	(G)	Diana	(II)

object, word or phrase (Transcription Nos. 7, 10, 11, 30, 31, 76, 87); for example: Subject K.J. thought that he "shouted out or heard shouted out the word 'Eileen'. It was rather strange", (Transcription No. 87), 'Eileen' being the stimulus name; and on one occasion, only a vague impression of theme was recalled (Transcription No. 58). By excluding these dreams, a total of 78 dream reports remained with which the subjects selected the correct stimulus name on 32 occasions, again performing significantly better than would be expected by chance alone ($\chi^2 = 10.69$, $P < .005$, $n = 1$).

An equal number of dream reports followed stimulation by emotional and neutral names and remained so on exclusion of the 8 short dreams.

When all the dream reports were included in the analyses, their total number shall henceforth be referred to as the Overall Total and their number which were matched with the correct stimulus names shall be referred to as the Overall Score. When short dreams were excluded from the analyses, the respective terms shall be the Reduced Total and the Reduced Score.

TABLE 2.

Number of Correct Matchings.

	Overall Score	Reduced Score
Subjects	$\frac{36}{86}$	$\frac{32}{78}$
Independent judge	$\frac{34}{89}$	$\frac{31}{81}$
Both judges	$\frac{24}{86}$	

2. Matchings performed by the Independent Judge.

The independent judge was presented with a total of 89 dreams, being three more than the total presented to the subjects since the tape recordings of two dreams were not available for subject P.M. (Transcription Nos. 4 and 5), having been accidentally 'wiped clean' (the independent judge relying on the transcriptions alone); and of the three occasions on which a subject perceived the stimulus, this occurred once following a single presentation of the stimulus (this dream being rejected) and references to hearing of the stimulus in the remaining two dreams removed as described above (P. 95). One of the latter two dreams which was recalled by subject G.M. from which he was awakened by and misperceived the stimulus 'Gillian' as a name beginning with the letter 'D' (Transcription No. 34) was included in his matching series since, at the time of the matching session which followed several months after the nocturnal sessions, he had no longer any memory of what he had heard (the tape recorder being stopped just prior to his reference to the stimulus).

Out of the Overall Total of 89 dreams, the independent judge matched the correct stimulus name with 34 ($\chi^2 = 8.27$, $P < .005$, $n = 1$). When short dreams were excluded, 31 out of the Reduced Total of 81 dreams were matched with the correct stimulus name ($\chi^2 = 7.61$, $P < .01$, $n = 1$).

On four occasions, the subjects recalled a voice in the dream which repeated either the stimulus name or a word of similar sound and appeared unrelated to the main course of the dream. Subject R.H. recalled a voice repeating a word "something like 'Sinndy' . . . I've got the feeling it was something Scottish" (Transcription No. 63), the name 'Sandy' having been played, being a

diminutive of the Scottish name, Alexander. Subject E.S. on 3 occasions on separate nights recalled dreams in which a female voice repeated a word or name "in the background of the dream, it . . . seemed to be an echo in the distance, it was quite mysterious". On two of these occasions, the name 'John' was being repeated (Transcription Nos. 75 and 79), that name having been played; and on the third occasion, the word 'Yes' was repeated (Transcription No. 77), the name 'Chris' having been played. In all the above instances, the correct stimulus name was matched with the dreams by both judges. However, the voice seemed to the subjects to be incongruous in the dream, although they considered it to be a genuine dream experience, and since the stimulus was not incorporated into the main context of dream events as in all the other cases, it was decided to adopt the most rigid criteria for determining incorporation of the stimulus into dream events. All such dreams in which a repetitive voice was heard and all short dreams (which included one instance of an isolated repeating voice, Transcription No. 76) were excluded from the analysis. On doing so, 77 dreams remained, out of which 27 were matched by the independent judge with the correct stimulus name, statistical significance still being reached ($\chi^2 = 4.16$, $P < .05$, $n = 1$).

3. Same Correct Matchings performed by Both Judges.

It is important to ascertain which dreams were matched correctly by both judges, for if different dreams were matched with the correct stimuli by the subjects and the independent judge, this must lead one to believe that more dreams were influenced by the stimuli than one might suppose by considering the results of each

matching series by subjects and independent judge independently.

In Table 1, are presented the matchings performed by the subjects and the independent judge. Of the 86 dreams which were presented to both the subjects and the independent judge, 24 were matched correctly with the stimulus names by both judges. The total number of correct matchings by the subjects and the independent judge were 36 and 33 respectively.

If the correct matchings by the subjects and independent judge were entirely uncorrelated, the probability by chance alone of the same 24 dreams being matched with the correct stimulus name by both judges is equivalent to that of drawing 24 red billiard balls from a bag containing 86 billiard balls, of which 36 are coloured red and 50 white, given 33 draws. The probability of arriving at such a result is given by the function:

$$P = \frac{33!}{9!} \cdot \frac{36!}{24!} \cdot \frac{50!}{12!} \cdot \frac{53!}{41!} \cdot \frac{1}{86!}$$

$$= 4.805 \times 10^{-6}$$

Clearly the chances of drawing more than 24 red balls given 33 draws becomes progressively less and one must conclude that there was a tendency for both the subjects and the independent judge to match the same dreams rather than different dreams with the correct stimulus. Such a result suggests that the external stimuli influenced a distinct number of dreams in a manner recognisable to both the subjects and the independent judge rather than a larger number of dreams recognised separately by each.

4. Levels of Confidence.

In Table 3, are presented data relating the successes of the judges with the confidence with which they matched the stimuli with the dreams.

The subjects classified their responses into two categories: 'Connection' and 'Guess'. Responses falling into the former were made when they thought a connection existed between the stimulus and dream events; those falling into the latter were considered to be sheer guesses.

Both for the Overall Score and the Reduced Score, the number of successes which they claimed to have arrived at by virtue of a connection between stimulus and dream events was significantly greater than those which they claimed to be guesses (for the Overall Score $\chi^2 = 4.49$, $P < .05$, $n = 1$, for the Reduced Score $\chi^2 = 5.11$, $P < .025$, $n = 1$).

The independent judge rated his matchings according to four levels of confidence (I, II, III and G). He made a significantly greater number of correct matchings at a confidence level of I than at any other confidence level (for the Overall Score $\chi^2 = 5.77$, $P < .025$, $n = 1$, for the Reduced Score $\chi^2 = 3.92$, $P < .05$, $n = 1$). For the Overall Total of 89 dreams, he only rated 19 of his matchings with a confidence level of I, of which 13 proved to be correct, and for the Reduced Total, 11 of the 17 matchings rated at a confidence/^{level} of I proved to be correct.

For the 24 same correct matchings performed by both the subjects and the independent judge, half of these were made by the independent judge at a confidence level of I although he had made less than one quarter of the common total of 86 matchings with this level of confidence ($\chi^2 = 10.87$, $P < .001$, $n = 1$).

TABLE 3

Levels of Confidence

The number of correct stimulus name-dream matchings made at each confidence level

(a) by the subjects:

Confidence Levels	Overall Score	Reduced Score
Connection	$\frac{26}{47}$	$\frac{24}{43}$
Guess	$\frac{10}{39}$	$\frac{8}{35}$

(b) by the independent judge:

I	$\frac{13}{19}$	$\frac{11}{17}$
II	$\frac{8}{30}$	$\frac{7}{28}$
III	$\frac{12}{37}$	$\frac{12}{34}$
G	$\frac{1}{3}$	$\frac{1}{2}$

(c) by the independent judge for the 24 correct matchings performed by both judges:

I	$\frac{12}{19}$
II	$\frac{6}{30}$
III	$\frac{5}{34}$
G	$\frac{1}{3}$

These results clearly indicate that the judges made correct matchings consciously, with appropriate verbalisation of the reasons directing their choice rather than their performance being "unconscious" in nature.

5. Differences in Incorporation with Sex of the Subjects or Nature of the Stimulus.

There were no appreciable differences in the number of correct matchings made for emotional or neutral stimuli or in relation to the sex of the subjects, either when the matchings were performed by the subjects or by the independent judge.

6. Frequency of Incorporation.

The frequency of correct matchings of the stimulus with the dreams varied from 38.2 per cent to 41.9 per cent, depending upon whether the judgements were performed by the subjects or by the independent judge, and whether all the dreams were considered or short dreams excluded from the series. But these figures do not represent the frequency of incorporation of the stimulus into the dream events, for these figures are in part compounded of correct matchings performed by chance alone. On the other hand, there were many dreams recalled in which appeared a number of objects, for example, the dream in which a series of olive stones were being thrown against a window pane and "the ground was littered with shillings and sixpences" following the stimulus 'Liz' (Transcription No. 54), and with which neither the subject nor the independent judge was able to match the correct stimulus name. In other dreams appeared lists of names (Transcription Nos. 18 and 49) and words (Transcription Nos. 14, 23, 52, 66, 70, 82) or questions (Transcription Nos. 67 and 80). On many occasions, the number of objects, names or words corresponded to, or was of

the same order as, the number in an uninterrupted group of repetitions of the stimulus and the time of occurrence of such events in the dream bore a close relation to the relative time at which the group of repeated stimuli was introduced during the REM period. In as many as 10 of the total series of dreams appeared a list of words or names and, in a further 4, a number of objects. Not all of these dreams were matched with the correct stimulus names although it is probable that incorporation was taking place. Furthermore, on two occasions the subjects dreamed of what was occurring in reality, i.e. that personal names were being played to them while they were asleep. On one of these occasions, neither judge was able to select the correct stimulus name since the subject recalled being stimulated by a variety of names but did not mention that of the stimulus (Transcription No. 27). It is apparent in this instance that modification of the dream by the stimulus was taking place although correct matchings were not made.

Further, much dream material was forgotten, or claimed to have been forgotten, at the time of recall, and it is indeed surprising how frequently stimuli were matched correctly with the dreams despite the brevity of the dream material.

In order to examine the forms in which the stimuli were incorporated into the dream, one must decide which dreams were in fact modified by the stimulus. For the reasons given above, there appear to be no adequate criteria by which one can make such judgments and one must ultimately rely upon a reasonably subjective analysis of the dreams. Even in the case of a seemingly obvious relationship between the stimulus and dream events, such as 'Jenny' and a 'jemmy' (Transcription No. 6), one is not justified in

dogmatically asserting that this dream incorporated the external stimulus since the association might be coincidental. However, statistical analysis suggests that the probability of such a large number of coincidences as were observed is small enough to be ignored. One can therefore conclude that for the series of dreams as a whole (but not for any specific dreams) incorporation of the external stimuli into the dream events took place. The analysis that follows is therefore only a tentative one and it must be continually borne in mind that examples quoted may have been arrived at fortuitously.

It is therefore impossible to arrive at an absolute figure of frequency of incorporation of the stimuli into the dream events, in the present study. However, it was decided to make a subjective estimate of this frequency. Only those dreams in which there appeared to be a definite connection between the dream events and the stimulus were scored positive, and those dreams in which a series of words or objects alone, with no further connection with the stimulus, scored negative.

Out of the Overall Total of 89 dreams, 48 were scored positive, which represents a frequency of incorporation of 54 per cent. The Reduced Score was 45, which represents incorporation of the stimuli into the dream events on 56 per cent of occasions.

7. The Mode of Incorporation.

Of the 48 dreams which were considered to have been influenced by the stimulus, the mode of incorporation of the stimulus into the dream events appeared to fall into four different categories (figures in parentheses refer to the number of dreams in each category) :

- (a) Assonance (31)
- (b) Association (6)
- (c) Direct (8)
- (d) Representation (3)

(a) Assonance.

In Table 4, are listed the dreams considered to bear an assonant connection with the stimulus. The majority of dreams fell into this category. That this majority was not a result of subjective bias in the form of selective "sensitisation" to similarities between sounds of words in the dream narrative and those of the stimulus names, is indicated by a similar preponderance of assonant connections submitted by the independent judge; who claimed to have made 23 of his Overall Score of 34 correct matchings on the basis of assonant connections between the selected stimulus name and dream events.

Most frequently, the connection was one of a simple 'clang' between the stimulus and dream events. For example: subject P.M. recalled a dream in which he was opening a safe "with a jenny" following awakening from a REM period during which the name 'Jenny' had been played (Transcription No. 6). Subject R.H., following the name 'Robert', recalled dreaming of "a rabbit on a film" which was "slightly frightened and distorted" (Transcription No. 62). On a subsequent night, she dreamed of a "man who was sitting on the ground digging out a gourd . . . a lovely, round gourd" when the name 'Edward' had been played (Transcription No. 68).

Usually the stimulus was incorporated as a concrete object or thing, as in the above dreams. On two occasions, a specific person appeared in the dream in apparent response to the stimulus,

TABLE 4

Stimulus Names and Dream Events Bearing

Apparent Assonant Connections

Subject	Dream Transcription No.	Stimulus	Dream Events
P.M.	6	Jenny	Jenny
	7	Shirley	Stercobilin
	12	Laura	Cornwall, border, boulder, build low, wall, landlord.
	13	Jenny	Cheques, money, 1920 (-twenty), 1930 (-thirty)
	14	Elfriede	8 words - Kaffa, fashion, clock-face.
C.S.	18	Peter	Three ticks, potato, Portobello.
	19	Norman	Lancashire dialect (Northern), wardrobe, dormitory, linoleum.
G.M.	24	Gillian	6 makes of motor-cycle (6 stimulus presentations)
	25	Diana	Drowsing, downward, drifting, couldn't ... down, sandwich.
	28	Shirley	Church, hymns, sailors, kirk.
	29	Diana	Rice, dish, idyll, paradise.
	33	Rosemary	Refectory, impose, got up (rose).
	35	Shirley	Spanish, desert, shelter, shelf, gypsy.
P.H.	40	Andrew	Land, centrifuge, hand.
	42	Mike	Like.
	44	John	Pond, Marchmont, Jim, just going on.
	48	John	Jag, almonds.
K.F.	50	Sheila	Slippers, Readers (Digest), lap, (sheik, see P.126)
	54	Liz	Olive stones, links, shillings, mattresses, flowers, logs.
	60	Sheila	Schiller, bolshie, philosophy.
	61	Carol	Carella, cerebral.
R.H.	62	Robert	Rabbit (distorted).
	67	Robert	Logic, dots.
	68	Edward	Gourd.
	69	Sandy	Sines and coses, psychology, maths degree, trigonometry, triangles, formulae.
	72	Sandy	Biscuits, boxes of biscuits (see P.111)
E.S.	81	Kenny	Concert, character, comedian, rock, crack, (Scots = canny, see P.111)
	82	Chris	Sex, change is the essence.
	84	John	Chops and strawberry jam.
K.J.	91	Naomi	An aim to ski, friend who says "Oh", show me.
	94	Gillian	Came from Chile (i.e. a Chilean), linen.

as illustrated by the dream of subject K.F., in which a girl named 'Carella Brown' appeared (Transcription No. 61), the stimulus being 'Carol' (a neutral name). In the preceding dream of the same night, the stimulus 'Sheila' was incorporated in the form of a book by 'Schiller' (Transcription No. 60), an object with reference to a person. Occasionally, incorporation was in the form of an abstract concept or idea unaccompanied by any specific visual imagery. For example, subject K.J., following presentation of the name 'Gillian', recalled a dream, extracts of which were as follows:

"I . . . was shown into a very large room . . . and a middle-aged lady was sitting up in bed . . . she rang for the maid and asked her to bring breakfast . . . it was a strange thing but I was wearing a dressing gown . . . and I was wearing pyjamas . . . and a scarf . . . and yet I had been outside . . . and I sat down beside the bed Something that seems strange - when I was sitting there, I seemed to be trying to think something about this woman . . . and I can remember remembering, as it were, that 'Oh, yes, she came - this woman came from Chile' . . . and I can remember her running about in her bare feet on rocky ground I remember both these things quite clearly." (Transcription No. 94). This dream illustrates the frequent precedence of the description of the incorporated dream event (in this case, that the woman came from Chile, i.e. that she was a Chilean), by phrases such as, "something that seems strange", "I don't know why . . ." (Transcription No. 60), "I remember suddenly thinking" (Transcription No. 50), or "I had a vivid sort of picture . . ." (Transcription No. 35). Sometimes, following the incorporated event, the subject might

add, "It was a funny thing that . . . rather odd" (Transcription No. 28). The strangeness, incongruity, or vividness of the incorporated dream event is often underlined by such phrases. The dream about the woman who came from Chile continued; "I recalled . . . that she came from Chile in her young days. I knew that in her young days she had run about barefoot on rocky ground. I don't know why I thought those things at all". To the question, "Those thoughts you also find strange, do you?", K.J. replied, "Yes, only just from their almost irrelevant nature". Subject P.M., when asked whether the dream about opening the safe had been in colour, replied, "The only thing that was in colour was the jemmy. That's right, I know, a sort of red . . . it was in colour because I knew the thing was red. And it seemed to stand out, almost, because of that".

Often, the manner and tone (which can, of course, only be appreciated by listening to the tape recordings) in which the incorporated event is described, draws attention to it.

The perception of the stimulus name, as manifested by apparent incorporation into dream events, was usually as a single assonant word, but frequently as a series of words composed of assonant vowels or consonants. Subject P.M., following the stimulus 'Elfriede' (pronounced 'Ellfreeder') recalled a dream in which he was "trying to remember . . . as many words beginning with 'K', 'A', double 'F' . . . and I seemed . . . to remember . . . several - the only one I can remember recalling was KAFFA . . . I had an image of them as if they were in a cartwheel fashion . . . the image was of a sort of clock face . . . the terminal part of the word . . . differed", (Transcription No. 14). Subject P.H., following

the stimulus 'John', recalled a dream about driving a car accompanied by two boys. "The car was parked fairly near Blackford Pond . . . so we moved on and we decided we would go up to Marchmont . . . there were people sitting . . facing the sun . . one of them . . was . . a boy I know called Jim . . I think it was just as I was going on that you woke me up . . " (Transcription No. 44). Subject G.M., following the stimulus 'Shirley', recalled a dream of "a Spanish desert . . . and a shelter had been set up . . . it was constructed against . . a sandstone shelf" (Transcription No. 35). Subject E.S., in response to the stimulus 'John', dreamed of "Chops and strawberry jam" (Transcription No. 84).

Occasionally, the stimulus word was perceived as a type of auditory 'gestalt' of parts of or whole words spoken in succession. For example, 'Peter' was probably perceived in a dream by subject C.S. as "three ticks" against a name of a firm to whom bills had been paid. The name of the firm "was something like 'Potato' or 'Portobello' . . " (Transcription No. 18). The first words of a dream narrative of subject K.J., following playing of the stimulus 'Naomi', were, "We're travelling up North . . having an aim to ski And I'm going up with a friend who says 'Oh!'" (Transcription No. 91). Here again the stimulus was apparently transformed into an abstract concept, an ideational aim, which was expressed verbally at the time of recall. Subject R.H. experienced "a whole lot of triangles and sines and coses" passing through her mind in a dream (Transcription No. 69), the stimulus 'Sandy' having been played.

On some occasions, incorporation of the stimulus appeared to be manifested by repetition of one or more letters of the stimulus

name in the dream narrative. Following the stimulus 'Sandy', subject R.H. recalled a dream in which her "mother was talking about some other woman . . . about biscuits. How she liked biscuits and she always had biscuits in the house, and there were no biscuits there . . . that she always had two boxes of biscuits", (Transcription No. 72). Subject E.S. recalled a dream in which the 'K' sound of the stimulus 'Kenny' was repeated: "I was at a concert . . . some Scots character was - I think he was mainly a comedian . . . the scenery was some rock with a crack in it", (Transcription No. 81). It is also possible that there was an unverballed association between 'Scots' and 'canny'. The high frequency components of the stimulus names appeared to be incorporated more often than those of low frequency.

High frequency sounds such as taps and clicks evoke K complexes very readily, although noises which appear much louder to waking consciousness fail to do so. Oswald (1962a) suggests that it is the higher pitch of the female voice that makes it more provocative of K complexes than the male voice.

No consistent trends were evident in the form of response to the stimulus name the dream event took. However, the 'J' and soft 'G' sounds were on four separate occasions apparently transformed into a 'Ch' sound in the dream. 'John' became 'chops' (Transcription No. 84), 'Jenny' became 'cheques' (Transcription No. 13), and 'Gillian' was transformed into 'Chile(an)' (Transcription No. 94). The masking "white noise" would doubtless be partly instrumental in the production of such distortions.

(b) Association.

In all instances, associations were submitted by the subjects

at the time of matching the stimuli with the dreams. Free association was never employed at the time of dream recall. Associations between stimulus and dream material were in all six instances rendered by the subjects, and such associations were entirely unanticipated since sufficient knowledge of the personal history of the subjects was not available in order for these associations to be readily apparent.

Dreams in which incorporation by association appeared to occur frequently showed manifestations of assonant incorporation as well. The independent judge, in fact, matched 4 of the above 6 dreams correctly on the basis of assonant connections. For example, in the dream of subject P.H., in which she was going to make an evening dress (see below for associations), there were assonant connections between 'Mike' and " . . . make an evening dress and sew it myself, and I was discussing with my mother how much material I would need . . . and telling her what it was I had in mind . . . I remember saying . . . 'I think I can get a dress out of two-and-a-half yards'" (Transcription No. 46). However, the following dreams were considered to display primarily incorporation of the stimuli by associative connection (the transcription number is given first, then the stimulus, following by a short description of the dream and the associations given by the subjects):

Transcription No. 53.

Subject K.F.

Stimulus: Maureen.

Relevant Dream Content: Being handed back his maths. book which had been marked in a peculiar manner, similar to the way his English master used to mark their books at school.

Associations: The name of his English master had been More.
Maureen (his current girl friend) studied maths.

Transcription No. 90.

Subject K.J.

Stimulus: Gillian.

Relevant Dream Content: Standing in a lunch queue and meeting a friend called Lawrence Brown.

Association: Lawrence Brown belonged to the same group of friends as Gillian and he.

Transcription No. 46.

Subject P.H.

Stimulus: Mike.

Relevant Dream Content: Was going to make an evening dress and was discussing it with her mother. Was looking through patterns of dresses which were not, in fact, evening dresses.

Association: On waking up, she had thought of the evening dress in connection with a wedding dress. She had been "unconsciously" thinking of marriage at that time in relation to Mike.

Transcription No. 45.

Subject P.H.

Stimulus: Richard.

Relevant Dream Content: Had been to a sale at a big shop in the centre of Edinburgh.

Association: Richard was the name of a shop in the centre of Edinburgh where she had been to a sale a day or so previous to the night of the dream.

Transcription No. 83.

Subject E.S.

Stimulus: Peter.

Relevant Dream Content: Speaking to a little boy who belonged to an Orphans' Society and who had quite a lot of dirt behind his ear.

Association: She knew a small boy called Peter who could well have been the one in the dream.

(c) Direct.

Direct incorporations of the stimulus into the dream are listed in Table 5. This category includes all dreams in which the stimulus was apparently incorporated directly as an externalised or internalised voice. On 5 of the 8 occasions when this occurred, the stimulus was incorporated as a background voice repeating the stimulus name or a distorted form of it without it having any apparent influence upon the main dream narrative. Once, the stimulus was experienced as a thought that the subject thought he might have shouted out in the dream. On the two other occasions, the subjects dreamed of what was taking place in reality, i.e. that a name (or names) was being played to them while they were asleep.

(d) Representation.

This category includes those dreams in which the person bearing the emotional stimulus name appeared either directly or in a disguised or transformed form. There was only one dream in which the latter was apparent. Subject C.S. recalled "an Indian woman with glasses in the dream - I can't remember why" (Transcription No. 16), the name 'Leslie' having been played, being the name of her Indian boy friend "who occasionally wears glasses" and a relationship over which she exhibited a certain amount of conflict.

TABLE 5

Dream Events Into Which the Stimulus Names Appeared
to have been Incorporated Directly

Subjects	Dream Transcription No.	Stimulus	Dream Events
P.M.	15	Shirley	'Shirley' played to him while asleep.
G.M.	27	Rosemary	Names of girls read out over loud-speaker while asleep.
R.H.	63	Sandy	Hearing someone calling 'Sinndy' repetitively.
E.S.	75	John	Someone repetitively saying 'John' in the background.
	76	Peter	Voice repeating 'DJ'
	77	Chris	Voice saying 'yes' as rhythmic background.
	79	John	Heard 'John' once and faintly.
K.J.	87	Eileen	Shouted out the thought 'Eileen'.

She spontaneously recognised the Indian woman to be a representation of Leslie at the time of the matching session.

There were two dreams (Transcription Nos. 57 and 95) in which the person bearing an emotional stimulus name appeared when the same name had been played during the associated REM period. It may be argued that the stimulus being the name of the person dreamed about happened by chance to be played at that time, there being a considerable likelihood of the sleepers dreaming at any time of their current or past boy or girl friends.

However, there were 6 dreams in the whole series in which the person bearing one of the emotional names appeared, and the independent judge selected that name on 3 of these occasions, being led to believe that the appearance of the friend was incidental in those dreams with which he did not select that stimulus name.

The probability of the stimulus name being played when the person bearing that name appeared in the dream is given by $P = 0.25$.

The probability of selecting those two dreams during which the appropriate stimulus name was played given 3 choices out of a total of 6 possible dreams is given by

$$\begin{aligned} P &= \frac{2}{6} \times \frac{1}{5} \times 3 \\ &= 0.2 \end{aligned}$$

Computing probabilities, the probability of arriving at the selections made by chance alone, is given by

$$P = 0.25 \times 0.2 = 0.05.$$

This result suggests that the stimulus name was, in fact, incorporated into those two dreams. Both dreams differ from the

others in which the person bearing an emotional stimulus name appeared, in the respect that the person was cardinal to the dream. Following the stimulus 'Maureen', subject K.F. recalled a dream (Transcription No. 57) in which an emotion of jealousy in relation to his current girl friend, Maureen, as the object was overtly expressed: "Ralph and myself, and Maureen, had been to a dance somewhere . . . Ralph was telling me about some time he had been out with her before . . . I remember feeling jealous anyway . . . I remember him saying that they'd been there before and he'd grabbed hold of her and said, 'I want to speak to you', and she said, 'Yes?', and he'd said, 'I have terrible dreams about you', and she said, 'Oh, do you?', and he said, 'Yes'. And he was completely put off by her . . . frank answer . . . I had in my hand a round bar of soap, which was a dull green in colour, which had on it . . . 'New Cold Scent' . . . and Ralph . . . said, 'Yes, that's the stuff she had on before', and I said, 'Oh, yes, but it's not the stuff she's got on tonight'". Subject K.J. recalled a dream in which his current girl friend, Eileen, appeared following presentation of that name, and which was remarkable for its Freudian symbolism: "I remember having been with Eileen . . . having something to take in . . . having to go into town and take back a big lamp . . . We're both away from home. . . Eileen had the lamp . . . I was with her . . . I don't recall saying something so much as conveying a message to Eileen . . . about arrangements for transporting this lamp . . . standing at the fireplace . . . the fireplace was cut over the corner and it was painted cream. And there was a pile of little cases beside it . . . this was where the bit about the lamp was occurring. . . Eileen . . . I don't know what

she was wearing . . " (Transcription No. 95).

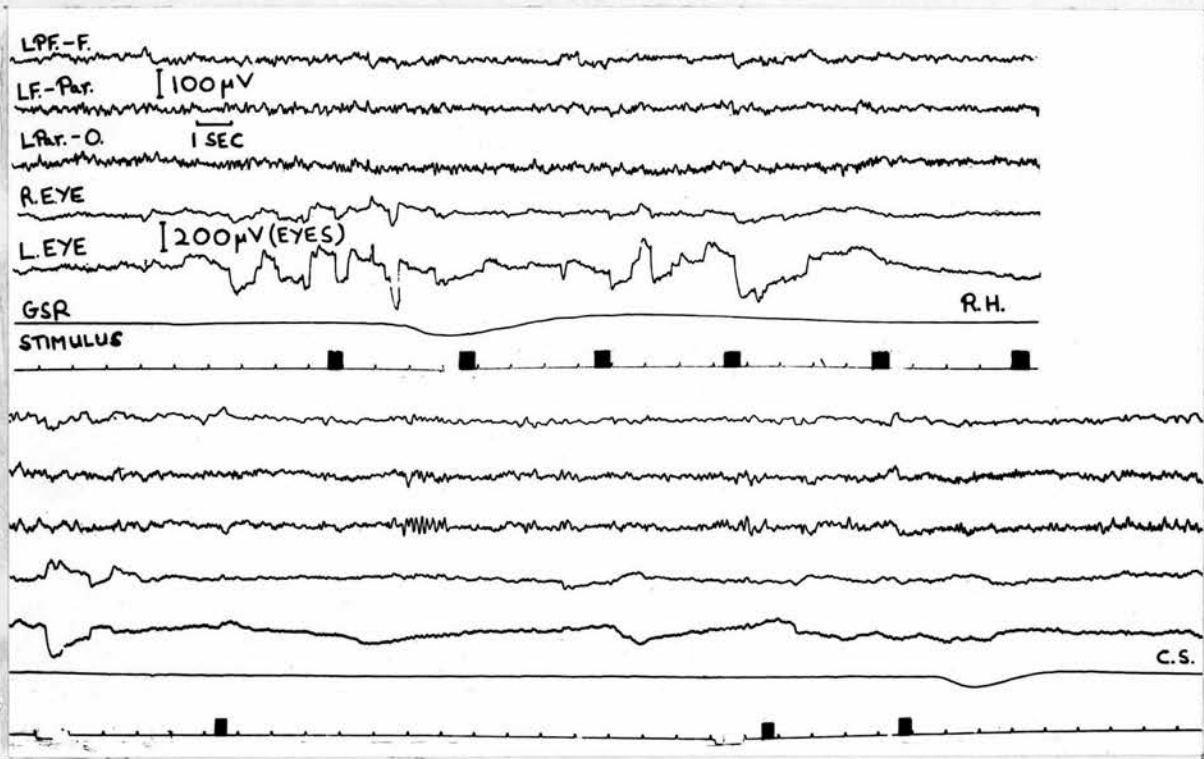
There was no instance in which a person bearing the name of one of the neutral stimuli appeared directly in the dream.

8. Galvanic Skin Responses and Presence of Alpha Rhythm.

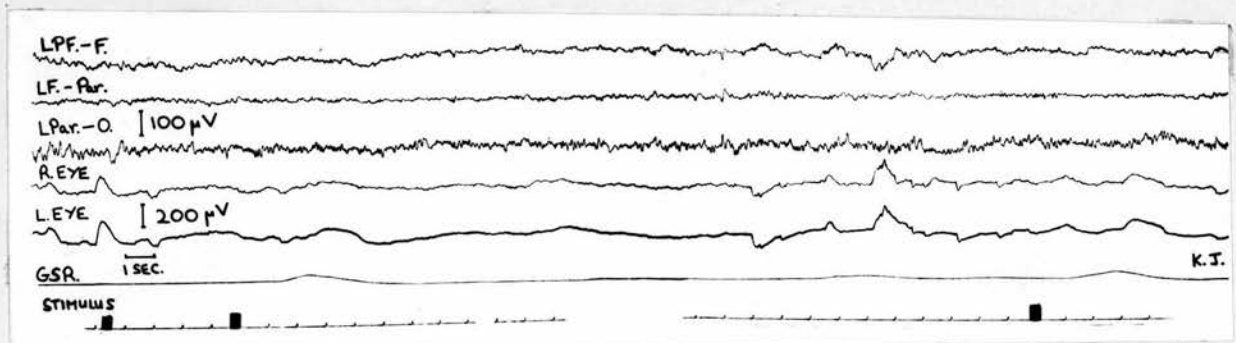
The recording of each REM period was examined from the time of onset of stimulation until the time of awakening. The total number of momentary variations in palmar skin potential occurring during this period were counted, excluding GSR's accompanying awakening. It was decided to adopt this procedure rather than attempt to count the number of GSR's directly following each stimulus, since random brief variations of skin potential indistinguishable from GSR's occur frequently during REM periods (and more often during C, D and E stage sleep) without being provoked by any discernible external stimuli, and it is impossible to determine whether fluctuations in skin potential, as shown following stimulus presentations in Figure VI, are genuine GSR's provoked by the stimuli or not. However, by counting all fluctuations during the period of stimulation, irrespective of whether they follow a stimulus presentation closely or not, genuine GSR's are included and their number influences the total score. The number of presentations of each stimulus during each REM period was also counted and the duration from the initial stimulus until awakening determined; the number of fluctuations in palmar skin potential per stimulus presentation per unit time could thus be calculated, being directly proportional to the number of GSR's evoked.

Brief appearances of alpha rhythm having a duration of up to 10 seconds are frequently seen during REM periods and such periods of momentary arousal had occasionally been observed to

Figure VI.



a. Examples of probable GSR's to stimulus names (see text).



b. Further examples of probable GSR's to stimulus names: but note the smaller fluctuation in skin potential towards the end of the 30-second interval between stimulus presentations (see text).

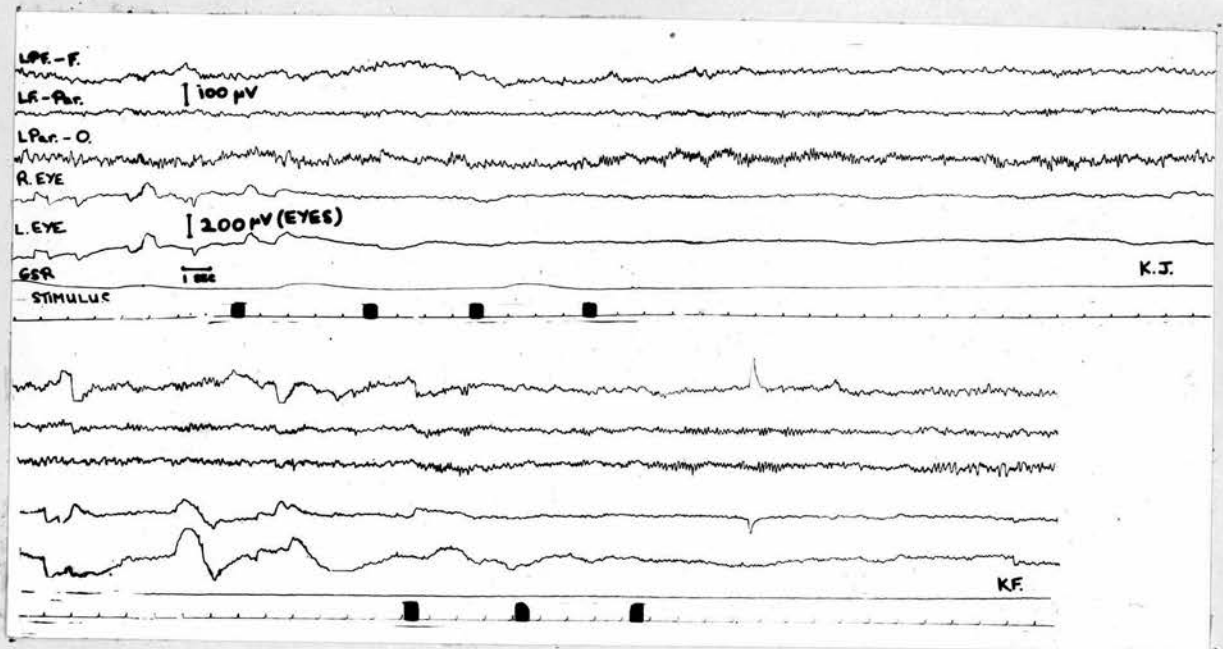


Figure VII.

Two examples of short wave-trains of alpha rhythm in the EEG following stimuli.

follow the stimulus during the experimental sessions (Figure VII). It was considered possible that during these brief periods the sleeper is momentarily in a state equivalent to the hypnagogic state during which misperceptions of external stimuli similar to those observed in the present study have been frequently recorded. Each instance of momentary arousal immediately following the stimulus during which alpha rhythm was continuously present in the EEG for more than two seconds was noted, in order to investigate whether those dreams in which incorporation of the stimulus was evident were associated with such momentary arousal; and whether such periods were related to the significance of the stimulus.

All REM periods during which stimuli had been introduced were included in the analyses even if the subjects were not awakened or did not recall a dream experience on awakening.

The relevant data are presented on Table 6.

There was no significant difference between the number of fluctuations in palmar skin potential per stimulus per second during these REM periods in which emotional stimulus names were presented and those in which neutral stimulus names were presented. There was also no significant difference between the frequency with which alpha rhythm was provoked by neutral and emotional names.

*
TABLE 6.

	<u>Total Duration of REM Periods</u>	<u>No. of Stimulus Presentations</u>	<u>Fluctuations of Skin Potential</u>	<u>Runs of Alpha Rhythm</u>
Emotional Names	9875	686	77	25
Neutral Names	7765	585	62	21
Same Matchings	4101	306	18	11
Different Matchings	10532	729	104	30

* For explanation of table, see main text.

When those REM periods associated with dreams matched correctly with the personal names by both judges were compared with those associated with dreams with which different matchings were made by the judges, similar negative results were obtained. The number of fluctuations of palmar skin potential per stimulus per second and instances of alpha rhythm per stimulus did not differ significantly during those REM periods associated with each category. Further, the number of stimuli introduced per dream in each category did not differ significantly.

These results indicate that incorporation of the stimulus into the dream events was not associated with presence of alpha rhythm in the EEG following presentation of the stimuli.

9. Incidence of Colour Experiences.

Unless colour descriptions of dream content had been submitted spontaneously during the dream report, the subjects were asked whether they had experienced colour in their dreams. Those dream transcriptions in which distinct visual images were recalled were examined for presence of colour imagery. The results are presented in Table 7.

Dreams in which the subjects claimed to have experienced colour are divided into two categories: 'Certain' and 'Uncertain'. The 'Certain' category included all those reports in which the subjects claimed with conviction that colour was present, or in which a specific object was recalled as being in a colour with which such an object is not commonly associated, as when subject P.M. recalled "the jemmy being red" (Transcription No. 6), or subject K.F. recalled, "The pictures . . . were like something out of 'Geographical Magazine' . . . I can remember the colours very well. There were purples and yellows and fawn colours" (Transcription No. 54). Included in the 'Uncertain' category are those dreams in which the subject had a vague impression of colour, a typical report being, "I think it might have been . . . it wasn't so vivid colours as some of the ones I've had . . . no, I think this was in colour (Transcription No. 71), or those dreams in which a specific object was recalled in colour (however firm the subject's conviction), but that colour being invariably or commonly associated with that particular object; for example, "I saw the colour of the sand. I mean, I knew it was that bright, bright, terribly bright gold colour" (Transcription No. 35).

55 of the total of 77 dreams were scored positive for presence of colour, representing a frequency of colour experience of 71 per

TABLE 7

Experience of Colour in Dreams

Subject	Colour		No Colour	Pre-experimental Impression
	Certain	Uncertain		
P.M.	1	3	4	Black-and-white
C.S.	2	3	2	Coloured
G.M.	0	3	8	Coloured
P.H.	7	3	0	Always coloured
K.F.	4	5	2	Black-and-white
R.H.	3	3	5	Usually black-and-white.
E.S.	4	4	1	Coloured
K.J.	10	0	0	Coloured
Totals	31	24	22	

cent. 31 of those 55 dreams scored positive fell into the 'Certain' category, representing 40 per cent of the total. The visual imagery of 4 of those dreams scored negative consisted entirely of printed words, such as a list of questions or a page of a book. Since words are commonly printed in black ink upon white paper, one might not expect colour to be reported. If such dreams are excluded from the analysis, the frequency of experience of colour, from a total of 73 dreams, was increased to 75 per cent.

H. DISCUSSION.

1. Differences between Matchings by Subjects and by the Independent Judge.

The results clearly support the hypothesis that during dreaming continual cortical analysis of external stimuli is occurring and that meaningful stimuli are incorporated into the dream events. Although the subjects, compared with the independent judge, had little experience of the processes involved in dream thinking, and the conditions under which they performed the stimulus matchings with the dreams were less favourable for success, since only the tape recordings were available to them with less time in which to consider their judgements, they performed equally well and even slightly better than the independent judge. This could be attributed to the vagaries of chance; a greater number of correct guesses being achieved by the subjects; or, alternatively, some definite causal factor might have been present. It might be expected that those dreams in which the mode of incorporation appeared to be by associations, as revealed by the subjects, would not be matched with the correct stimulus name by the independent judge. However, this did not prove to be the case; of the 6

dreams falling into the category of incorporation by Association, 4 were matched correctly by the independent judge as well as by the subjects. These correct matches were probably achieved by him by reason of assonant connections between stimulus and dream events being present in addition to the associations rendered by the subjects. It seems likely that some of the correct judgements made by the subjects but not by the independent judge were dependent upon connections between stimulus and dream events not readily available to the independent judge owing to the particular words in which the dream description was couched. For example, G.M. recalled a dream (Transcription No. 33) in which "there was a typical story-book Nazi officer . . and a few soldiers . . . the officer told everybody . . that they would all obey his orders on pain of death . . And then a bell went . . . and everyone got up to go out, and the officer told them to sit down". G.M. correctly selected 'Rosemary' as the stimulus name, his reasons being that at the end of the dream everybody "arose" to go out. When the tape recording was played back to him, he "relived" the dream and he considered the word "arose" to be a more appropriate description of the soldiers' behaviour than "got up". A similar example of an unverbaised free association to an element of a dream which prompted the choice of the correct stimulus name is that of subject K.F., who recalled a dream in which a figure suddenly appeared at the end, "an oriental 'type' who had on a turban and . . a sort of cream-coloured silk jacket with white trousers . . with a stripe down one side . . I can remember . . well, that the man was coloured . . he was definitely Indian" (Transcription No. 50). The subject correctly chose the stimulus 'Sheila' because at the

time of recall he "had thought of the man as a Sheik". The above examples are the only two examples of such connections and associations which were not verbalised at the time of recall but were "reactivated" when listening to the tape recordings, and it is possible that other correct choices were inspired by such associations but the subjects might have considered them too trivial to mention and designated their stimulus matchings as guesses. The possibility of correct matching without awareness of the subject of any reasons governing his choice should not be excluded, in the light of the study of Dixon (1958) in which subjects were able to match their responses to "subliminal" stimuli with those same stimuli when presented "supraliminally" without submitting a verbal explanation of the reasons for their matchings. It is possible that free association to elements of the dream might have revealed further connections between such elements and the stimulus name, but such focussing upon specific elements would have invalidated any subsequent "blind" matchings performed by the judges.

2. The Function of the Dream.

The experiment was not designed with a view to examining the validity of psychoanalytic interpretations of the dreaming process. However, the results appear to support the views of Freud (1954) regarding the function of dreams. Freud, on examining theories in which external stimuli were identified as the sources of dreams, considered them to provide an inadequate explanation of the insufficient frequency of external sources of stimulation and "why it is that the external stimulus of a dream is not perceived in its true character but is invariably misunderstood . . .

and secondly, why it is that the reaction of the perceiving mind to these misunderstood stimuli should lead to results of such unpredictable variety". The above quotation is extremely pertinent to the present study. Freud considered that "the motive for dreaming lay elsewhere than in somatic sources of stimulation" and proposed that dreams were psychical in origin, the external stimulus being more frequently woven into the dream rather than provoking it. Freud suggested dreams to be "the guardians of sleep and not its disturbers . . we are already in a position to show that it is applicable to the part played by objective external stimuli. Either the mind pays no attention at all to occasions for sensation during sleep - if it is able to do this despite the intensity of the stimuli and the significance which it knows attaches to them; or it makes use of a dream in order to deny the stimuli; or, thirdly, if it is obliged to recognise them; it seeks for an interpretation of them . . . in order to rob it of reality", (italics in the original). The results of the present study are, for the most part, consistent with such an interpretation.

That external stimuli do not induce dreams, in that REM periods are not provoked by such stimuli, has been common experience (e.g. Dement and Wolpert, 1958); however, an accidental instance of a dream being provoked by an external stimulus during EEG high voltage slow wave sleep has recently been reported by Kugler and Verdeaux (1962), but although an arousal response was clearly present in the EEG with alpha rhythm, the typical B stage EEG accompanied by rapid eye movements normally associated with dreaming was not provoked by the stimulus, and it is likely that the experience was hypnagogic in nature rather than a genuine dream experience.

The proposition that the stimuli are woven into the dream to rob them of reality is clearly appropriate to many examples of incorporation displayed in the present study. Representations of the stimulus in the dream cannot be ascribed to be simply one of misperception of the stimulus owing to lowered cerebral vigilance accompanied by deterioration of perceptual processes, a process by which many of the assonant incorporations may be explained. The two occasions on which the subjects dreamed that names were being played to them while they were asleep (Transcription Nos. 15 and 27), subject P.M. even claiming to wake up in his dream although he in fact slept on, are clearly examples of denial of the stimuli and are similar to the example quoted by Freud of the medical student "who was roused by his landlady and told that it was time to go to the hospital, and who proceeded to dream that he was in bed at the hospital and then slept on under the pretext that as he was already in the hospital there was no need for him to get up and go there". It is more difficult, when considering the manifest content of the dream, to determine whether incorporation of the stimulus was "into a component part of a situation which is wished for". However, it is notable that those dream events into which the stimulus was incorporated, and in which typical sexual symbols commonly attributed to Freud appeared, were invariably associated with emotional stimulus names. The dream of subject P.M., in which the "jemmy . . the only thing in colour . . . was red" (Transcription No. 6) was associated with 'Jenny', his previous girl friend. The dream of "Eileen . . a big lamp . . . the fireplace . . painted cream . . pile of little cases" (more fully quoted on P. 117 Transcription No. 95) was associated with the stimulus name 'Eileen', who was subject K.J.'s current girl

friend. Subject K.F. dreamed of "a snake of fairy lights which emerged out of one of the guitars, and the snake snaked out and then snaked back again . . . and then there was a flash . . an explosion of some kind" (Transcription No. 59). The name of a previous girl friend 'Liz' had been played and it is probable that "slid out of" would have been a better verbal representation of the dream imagery than "emerged out of". Following the stimulus name 'Edward' (being a former boy friend) subject R.H. recalled a dream of a "man . . digging out this gourd, a lovely, round gourd . . with a knife . . the gourd. . it's a sort of thing like a cucumber only round, when you dry them and cut them out, you can use them for keeping - as a cup" (Transcription No. 68). The dream of subject C.S., in which she "had been tossing and turning . . you were dressed in a top hat, morning suit, and you were smoking a cigar. And someone handed me a cigarette . . . which had been lit at the tipped end and at the other end. I smoked it but I wasn't burned or anything . . at the tipped end . . . it was all sort of frayed and burnt. I don't know whether it was still burning at the end that I smoked it . . and I remember I inhaled - I don't normally inhale . . as I was smoking it . . . there was an Indian woman with glasses in the dream" (Transcription No. 16) followed the stimulus name 'Leslie' of her current Indian boy friend. The dream of subject E.S. (Transcription No. 81) following presentation of her current boy friend's name, 'Kenny', "of a comedian . . it was the first time he had performed to this audience . . the scenery was some rock with a crack in it and he'd been telling some story about this crack in the rock . . saying how long it had been going to fall . . . another crack in the rock and it fell on top of him . . I

remember the rock . . the scenery . . . a tree sprouting forth". No such classical sexual symbols appeared in the dream events into which neutral stimuli appeared to have been incorporated. Further, it has already been noted (P. 117) that in those dreams in which the girls friends of the subjects appeared when those particular names were played during the associated REM periods, an emotional attitude was expressed towards them as compared with other dreams in which boy or girl friends of the dreamer appeared without accompanied presentation of their stimulus names. Whether this emotional expression in the dream represented an underlying "unconscious wish" of the dreamer cannot be ascertained from the manifest content of the dream alone. However, the presence of sexual symbolism in dream events into which the emotional stimulus names appeared to have been incorporated with accompanied emotional expression towards those persons is not inconsistent with Freud's interpretation of incorporated external stimuli forming the nuclei for the expression of unconscious wishes.

3. Significance of the Stimulus.

The prediction that a greater number of emotional stimulus names than neutral stimulus names would be matched correctly with the dreams was not confirmed. This prediction was derived from the hypothesis that a perceptual response would occur to emotional stimuli more frequently than to neutral mental stimuli in the light of the study by Oswald et al., (1960) in which cortical analysis of a stimulus during sleep was shown to precede arousal. The results suggest that perceptual awareness of the stimulus is coincident with cortical analysis of the stimulus and is not dependent upon the significance of the stimulus, and that the

external origin of such awareness is not recognised. It is possible that the ongoing mental activity during REM periods accompanied by a uniform external stimulus pattern is not interrupted by a disruption of this stimulus pattern but that the external stimulus is perceived as belonging to the events of the dream.

However, the manner in which the course of the dream events is altered is different for emotional and neutral stimuli, on occasions. Perceptions directly related to the stimulus by assonance appeared to be the most frequent for both kinds of stimuli and occasionally they were perceived veridically; but the response to emotional stimuli appeared to be more complex on occasions, such that by mediate associations, perception of the stimuli was evident in the dream.

4. The Perceptual Response.

Jouvet et al., (1960) reported raised auditory thresholds during the "paradoxical phase" (compared with the phase of EEG slow waves) in cats. However, similar observations during REM periods have not been reported in humans. On only two occasions following over 1200 stimulus presentations throughout the present study did awakening occur accompanied by veridical perception of the stimulus. The number of instances in which alpha rhythm in the EEG or a GSR was evoked by the stimulus was comparatively small (although some change in the EEG pattern was usually present, since this was the criterion by which the stimulus intensity was controlled). No comparative measures of arousal to the stimuli were performed during C, D or E stage sleep, but Rechtschaffen and Shaikun (1962) observed more frequent awakenings during REM periods than during NREM periods to stimuli of equal intensity.

However, those dreams in which incorporation of the stimulus appeared to take place (as defined by correct matchings with the stimulus by both judges) were not associated with greater arousal as indicated by the alpha rhythm in the EEG or GSR's to the stimuli as compared with those dreams in which there was no evidence of incorporation. It therefore seems that those dreams in which a perceptual response to the stimulus appeared to occur were unaccompanied by any observable differential physiological response from those dreams in which no such perceptual response was evident. It is possible that a perceptual response and incorporation of the stimulus into the dream occurred invariably but that this could not be discerned owing to loss of dream material on recall, or inability to perceive connections between stimulus and dream events without recourse to free associations, which even then might be ineffective in revealing such connections. However, the data obtained suggest that lack of overt response to auditory stimulation during REM periods in humans may not be a manifestation of an elevated auditory threshold, but of a perceptual response by means of which the stimulus is incorporated into the dream. Jouvett (1962), in addition to observing raised thresholds to auditory and reticular formation stimulation, as indicated by behavioural arousal and evoked potentials during "hind-brain" sleep in cats, noted diminution in responses to auditory clicks at the level of the cochlear nucleus which was inconstant but coincided frequently with movements of the eyes and vibrissae. Hernandez Péon^{et al.} (1956) observed such diminution in response at the cochlear nucleus with visual attention during wakefulness in cats, and Jouvett has proposed that such diminutions

are a manifestation of preoccupation of the cat with its dream imagery. The stimuli were frequently presented during rapid eye movement clusters, and if similar diminutions in cochlear nuclear response occur in humans during REM periods, it is possible that those stimuli which were not incorporated into dream events were not perceived owing to blockade at the periphery.

5. Similarities to Schizophrenic Thinking.

The similarities between the mechanisms of thinking in dreams and in schizophrenia have been pointed out by numerous writers. There also appear to be many similarities between the perception of external stimuli during dreaming and the perceptual responses to verbal stimuli and the relationships between successive elements of the thought processes of wakeful schizophrenics.

The assonant connections observed between the external stimuli and dream events are characteristic of the flow of similar connections (among other associations) in schizophrenic speech. Jung (1906) quoted an example of such speech (taken from Pelletier): "Je suis l'être, l'être ancien, le vieil Hêtre, que l'on peut écrire avec un H. Je suis universel, primordial, divine, catholique, Romaine, l'eusses-tu cru, l'être tant cru, suprumu, l'enfant Jésus. Je m'appelle Paul, c'est un nom, ce n'est pas une negation, on eu connaît la signification". The numerous assonant connections between successive words are underlined.

Jung quoted an experiment by Stransky in which subjects were instructed to talk at random into a phonograph for one minute, without paying attention to what they said. An initial stimulus word was given as a starting point and external distraction introduced in one half of the experiments. The recorded speech closely

resembled that of schizophrenics. In addition to associations of similarity, coexistence and motor-speech connections, there were many sound combinations in the flow of speech. Examples include: " . . . the storks are large birds - with a long beak and live on frogs, frogs, freegs, frogs, the frogs are froogs, in the morning (Früh) in the morning they are with - breakfast (Frükstück), coffee, and with coffee they also drink cognac . . . ", "K . . . was a K . . . with a long nose, with a ramnose, with a rampnose, with a nose to ram, a ram gift, a man who was rammed . . . etc."

Jung (1918) observed during his word-association experiments an increase in the number of "clang-reactions" (e.g. dish-fish) when attention was distracted and during drowsiness; seven times as many "clang-reactions" were observed during drowsiness compared with undistracted wakefulness, which led Jung to the speculation that since "It is known that during sleep attention is completely obliterated. Were we to succeed in producing reactions in a person sleeping (not somnambolic sleep), clang-reactions would certainly be the exclusive results".

Jung observed many mediate associations in simple word reactions under distraction. Sometimes sound reactions were involved. To the stimulus word "lawn", a gentleman reacted with the peculiar association "broker". Analysis revealed that he was completing some transactions with a loan office - "pawn-broker". The thought processes in the above example show a close resemblance to those by which the stimulus 'Maureen' was incorporated into the dream of the Maths. master handing back subject K.F.'s Maths. book (Transcription No. 53, discussed above P. 112).

Bleuler (1911), who had also noted the resemblances between schizophrenic thinking and dream thinking, described the frequent

clang-associations observed in schizophrenics: "In 'ink' - 'fiddle' the clang quality is hardly noticeable to normals. If, however, one gets the association 'but' - 'boots' and then 'battle' - 'that's a beauty', the investigator who is familiar only with the associations of manics and normals will look for other connections of 'boot' and 'beauty' besides their mere assonance. Yet hundreds of such combinations have taught us beyond doubt, the sameness, or mere similarity, of single sounds, suffices to codetermine the direction of associations (in schizophrenics)". Bleuler goes on to discuss the influences determining clang associations; sexuality and delusions of persecution frequently being determinants, he concludes: "The selection, then, must be determined by yet other factors, which, in the main, elude us". In the present study, the transformations 'Gillian' - Chile (Chilean), 'Sheila' - Schiller, and 'Edward' - Out a gourd, are equally inexplicable, the responses figuring very low in a normal word count (frequency with which given words occur in a representative sample of written or spoken speech); subject K.F. was not even sure what kind of writer Schiller was. The transformation 'Gillian' - Chile could conceivably have been via the mediate association 'chilly'; subject K.J. recalled thinking of removing his dressing-gown but "thought better of it because of the cold" (Transcription No. 94). Of course, one does not expect to be able to uncover the determinants of such transformations from the manifest content alone. Freud (1954) wrote that in the primary process "we find associations based on homonyms and verbal similarities treated as equal in value to the rest". He quoted a large number of associations to manifest dream elements involving word play similar

to the transformations observed in the present study. Freud considered these associations to disclose the latent dream content. For example, he described a dream in which appeared references to Italy - 'gen Italien' - 'Genitalien (genitals)' (compare with 'Naomi' - 'an aim to ski'). Freud (1914) considered that mistakes in speech revealed unconscious motives and he provided numerous examples of such errors: a patient, when asked where her cottage in M. was located, replied, "Near the mountain loin" instead of "mountain lane"; another example from Freud is of two women who stopped at a chemist and one said to the other, "If you wait for a few movements, I'll soon be back", being on her way to buy some castoria for her child. It is surprising that, although Freud quotes numerous examples of mistakes in speech, reading and writing in his 'Psychopathology of Everyday Life' in order to illustrate his theories of unconscious motivation, he does not refer to mistakes in hearing, which occur frequently, the distortions appearing to be equally significant.

The penetrating observations of Maury on the nature of hypnagogic hallucinations and dream thinking have been referred to by many authors. Maury (1853) described two dreams of his own in which a similarity between the sound of words provided a link between successive dream events. In one dream, he had set out on a pilgrimage (pélerinage) to Jerusalem or Mecca, not knowing exactly if he was a Christian or a Moslem then; after many adventures, he found himself visiting the chemist, M. Pelletier and after conversing with him, the chemist gave him a zinc shovel (pelle) which was transformed into a great war-horse (cheval de bataille) in a fleeting subsequent dream. Maury quotes a dream

of one of his acquaintances in which jardin, the explorer Perse Chardin, and a novel by M. Jules Janin appeared in consecutive events. In another dream of his own, Maury was thinking of the word kilomètre, and reading the milestones as he walked along the highway; suddenly he found himself on a big pair of grocer's scales on which a man was putting kilogrammes (kilos) on to one of the pans in order to weigh Maury; the grocer then said to him that they were not in Paris but on the island of Gilolo; a succession of scenes followed in which he saw a lobélia flower, then General Lopez, of whose death he had recently read. Finally, he woke up while he was playing a game of loto.

These examples from Maury are similar to the repeated sound reactions to the external stimulus which appear to occur in the dreams of the present study. It is difficult to ascertain whether, in fact, these repeated sounds are individual responses to successive presentations of the stimulus, or whether an assonant response occurs to the initial stimulus, which then acts as a link between one dream scene and the next, as in Maury's examples. Silberer (1909) described an instance in which his own hypnagogic imagery was determined by auditory stimulation: "I see first a mosaic of triangles, then one of squares, and so on. Then I have the impression that I myself am putting together the mosaic figures in rhythmical movements. Soon I find that the rhythm is that of the axles of the train which I hear continuously. This suggests the idea that autosymbolic pictures can be influenced by acoustic perceptions; thus a person talking to someone who is in a hypnagogic state could direct his imagery". This speculation is supported by the observations of the present study, in which it seems likely that the repeated stimulus determined the

repeated sounds rather than their arising autonomously from the dream.

Freeman (1962) in a recent paper relates the cognitive organisation in chronic schizophrenia to that of the dream state, with emphasis on the processes of condensation and displacement occurring in each state. He describes the delusion of a chronic hebephrenic which centred round the primitive concept "masterpiece". Freeman considers the connotations to the three separate parts, "mas", "ter", and "piece", into which the patient habitually separated the word, to illustrate condensation and displacement operating as a single process as in the dream. The component "mas" stood for the mass; for master in reference to Christ with whom the patient was identified; and it also represented headmaster. The other components had further meanings to the patient. The thought processes operating in this patient and in the dream of subject K.F., in which he was handed back his Maths book, which had been marked in a peculiar manner (Transcription No. 53, discussed above on P. 112), show a striking resemblance. Freud conceptualised the process of condensation, following analysis of numerous dreams in which he discovered a multiplicity of manifest elements to be related to a single latent thought; it is as though the external stimulus associated with the above dream is equivalent to a latent dream thought from which the manifest dream components stem, and it is possibly for its sleep protective role that similar processes may be discerned within the dream. It might be argued that the external stimulus is in fact veridically perceived at the time of its presentation while the subject is dreaming, and associations to the stimulus name provide the core

of the subsequent dream events, but it is surprising that in no instance in which such associations to the stimulus appeared to be present in the dream was reference to the person bearing the stimulus name made at the time of recall.

6. Similarities to Thinking in other Experimental States.

Changes in thinking and perception which accompany lowered cerebral vigilance in sleep deprived persons were described in Chapter V. The subjects, who went without sleep for 108 hours in the study described, frequently misperceived the speech of others towards the end of their vigil. Their misperceptions resembled those of the external stimuli in the present study. One subject misheard the question, "Are you doctors?" as "Have you stopped cursing?"; at a later time, to the question, "Who's to go?", the same subject replied, "Who's girl friend?". At another time, he referred to the National Trust for Scotland in reply to a question about a brush he was using while doing some interior decorating. Oswald (1962b) described misperceptions of and hallucinations to repetitive personal remarks played to non-schizophrenic patients undergoing "behaviour therapy". A tape-loop, on which, in addition to some clicks, vomiting noises and laughter, were recorded, the phrases "Rubberised clothing makes him sick . . . rubber mackintoshes make him sick . . .", was played continuously throughout the night to a rubber mackintosh fetishist. He reported hearing a wide variety of words and phrases spoken by various voices and included the following description: "The disjointed statement started again, something about mackintoshes being sticky, or sick. It was 'sick' or 'stick' . . . The voice kept saying, "There is nothing in the cup" . . . these three staccato knocks (the

clicks) which were the symbol of the cup later on . . Then later on, the mackintosh was called Brown Mackintosh and Brawn Mackintosh . . and Jim Mackintosh" (the name of the patient was Jim Brown). The voices ceased on switching off the tape recorder but returned the following night with an experience of a witch stirring his abdomen with a mixing-stick (probably related to 'makes him sick'). Another fetishist reported hearing the phrase, "I tied up my brother", which was probably derived from the phrase, "Tying up with rubber" recorded on the tape-loop.

Other evident misperceptions observed in other patients were "Fear and Guinness" instead of "Beer and Guinness"; "Miss Jick" instead of "makes him sick"; "He'd eight men" for "He'd meet men"; "Nathian ticks" and later "Napethian tick" for "make him sick".

All patients, with one exception, experienced changes in the voices and frequently they heard the voices saying completely different things from what was actually recorded on the tape-loops. The patients experienced such misperceptions and hallucinations after they had been socially isolated for up to four days, and they were subjected to a regular regimen of two-hourly injections of apomorphine and were also sleep deprived. Their experiences were similar to those of the hypnagogic state. The above conditions, together with the repetitive stimuli (Oswald 1960), are notably those which provoke periods of lowered cerebral vigilance or light sleep which are associated with the hypnagogic state (Oswald 1962a). However, the patients on occasions wrote down their misperceptions as they listened to the tape loop in the presence of the experimenter and could only be judged as wide-awake.

That misperception of repetitive stimuli is not dependent upon a state of drowsiness or light sleep has been shown by Warren (1961), who played tape-loops, on which had been recorded various words and phrases, to normal subjects, the repetition rate generally being extremely high. However, it was found that the numbers of different forms reported were about the same for equal numbers of stimulus repetitions over the range of 42-492 repetitions in 3 minutes. Surprisingly, fewer transitions and fewer different forms were reported when the same recording was accompanied by a masking noise than when played clearly. Warren found that all subjects thought the stimulus to which they were listening was actually changing, and even when this was not suggested to them (such suggestion being incorporated in the initial instructions) but that a single word would be played repetitively without change, they experienced verbal transformations. Many of the forms reported were quite dissimilar in sound to the stimulus. 'Tress' was heard to change to 'florist', and 'fill up' to 'lucky' by two subjects in each case. Whether such distorted incorporations of the stimulus into the dream events were occurring in the present study, it is impossible to determine; but Warren's results suggest that the frequency of incorporation of external stimuli into dream events is higher than can be estimated by the method adopted in the present study.

In Warren's study, responses to the word 'rape' revealed associations which were not present to other words with few emotional overtones. When 'rape' was played, the word 'prey' was heard more often than 'pray' although it is probably encountered less frequently; the successive changes reported by one subject

included: rake, break, go ahead, leg-break, sprout, spread out. Another subject did not report hearing the word 'rape' at all, but his successive responses included: rake, break, wrench, wench, drench, quench. The experiences were not compatible with an earlier view (Warren and Gregory, 1958) in which they were considered as an auditory analogue of the visual reversible figure, nor can they be considered as partial perceptions of the stimulus similar to those Pritchard (1961) has described, using written words with stabilisation of the image on the retina. Under Pritchard's conditions, fragmentation of the individual letters forming the words occurs, leading to perception of different words. The word 'BEER' was perceived as PEER, PEEP, BEE and BE; and the subjects were far less likely to report seeing meaningless groups of letters, such as EER. The observations of Warren, Oswald, Pritchard, and those of the present study, indicate that non-veridical perceptions are not simply fragmented or fortuitous distorted misperceptions of the stimulus but that a microgenetic (Flavell and Draguns, 1957; Arieti, 1962) dynamic process is involved, depending upon an interaction between peripheral and central processes.

7. Galvanic Skin Responses.

Oswald et al., (1960) found that K complexes were more likely to be provoked by the subject's own name than by other names. No difference in arousal (as measured by presence of alpha rhythm or GSR's) to neutral and emotional names was observed in the present study. However, in Oswald et al.'s study, the novelty of the stimuli was eliminated by playing the names to the subjects as soon as they retired to bed and continuously throughout subsequent sleep, with the result that the subjects were responding selectively to 'meaning' of the

stimuli alone. On the other hand, in the present study, there were remarkably few occasions on which GSR's or alpha rhythm followed the stimuli although perceptual responses appeared to be occurring. Other data indicate that "paradoxical" sleep is a qualitatively different kind of sleep from the other stages of sleep (Chapter II, P. 16), and Rechtschaffen and Shaikun (1962) observed fewer GSR's to an 80 msec. auditory stimulus during REM periods compared with NREM periods, but more frequent awakenings to the stimulus during REM periods.

8. Experience of Colour in Dreams.

The frequency of recall of colour experience in dreams was found to be much higher than has previously been reported (Ramsey, 1953). All subjects recalled dreams in colour and two subjects, who claimed to dream in black-and-white at the time of the interview, recalled many coloured dreams. The subject's pre-experimental impression of frequency of colour dreams was generally lower than that observed during the experiment.

Many of the dreams of the present study were imageless, and of those dreams in which visual imagery was prominent, colour was not often spontaneously recalled without questioning. Only those visual images which were particularly striking or significant were recalled as being in colour, or objects of which colour is an important attribute in waking life, such as clothes. Just as the dream is frequently forgotten unless the dreamer is awakened before its natural termination, so remembrance of colour fades unless a conscious effort is made to recall it at the time of awakening. Subjects frequently recalled more dreams spontaneously on awakening on mornings prior to commencement of the experiment (but following

initial interview) than they were usually accustomed to do, and similarly the subjects became more aware of the presence of colour in their dreams as the experiment progressed.

I. S U M M A R Y.

The principal findings were:

1. Spoken personal names were incorporated into the dream events, as manifested by the ability of the experimental subjects and an independent judge subsequently to match correctly the names which had been presented during the rapid eye movement periods with the associated dreams more often than would be expected by guessing correctly by chance alone.
2. Incorporation of emotional and neutral names into the dream events occurred equally often.
3. The mode of incorporation of the stimuli was consistent with an interpretation of the function of dreams as protective of sleep.
4. Perceptual responses to the stimulus names, as manifested by subsequent dream recall, occurred without any accompanied observable differential electroencephalographic or galvanic skin responses compared with those occasions on which no such perceptual responses were evident.
5. The frequency of recall of colour in dreams was higher than has previously been reported.

CHAPTER VIII.

SUMMARY.

A series of EEG studies of nocturnal sleep were carried out with particular reference to investigation of:

- (a) the electromyographic activity during sleep of the vocal musculature;
- (b) the nature of the rapid eye movements;
- (c) the pattern of sleep in patients suffering from melancholia.
- (d) the experimental modification of the sleep pattern following ingestion of barbiturates and following sleep deprivation; and
- (e) the effect of meaningful verbal stimuli during dreaming on the content of subsequent dream reports.

The principal findings were as follows:

(a) Electromyographic Activity of the Vocal Musculature.

A striking decrease in muscle tone preceded each phase of "paradoxical" sleep, rapid eye movements, and dreaming.

(b) The Rapid Eye Movements.

(i) Characteristic frontal EEG waves significantly often precede the rapid eye movements of dreaming.

(ii) The rapid eye movements were absent during the dream periods of three men with life-long blindness, and of two men, 30 and 40 years blind respectively, but were present during the dream periods of three ^{men} blind only 3, 10 and 15 years respectively.

(iii) "Passive" dreams were associated with little or no eye movement and "active" dreams with numerous eye movements, providing independent confirmation that the amount of rapid eye movement during dreaming is associated with the nature of the dream content.

(c) Pattern of Sleep following Sleep Deprivation.

On the first recovery night following 108 hours of sleep deprivation in 6 normal males, there was a significant increase in the mean percentage of total sleep time during which high voltage slow waves were present, associated with a significant decrease in the mean percentage of total sleep/^{time}spent in dreaming (determined by duration of rapid eye movement periods) on comparison with the base-line nights.

On the second recovery night, there was a significant increase in the mean dream time percentage compared with that on the base-line nights.

(d) The Pattern of Sleep in Melancholia^{and} following Ingestion of Barbiturates.

(i) 6 patients suffering from melancholia spent significantly more of the night awake than 6 sex- and age-matched controls, although times of awakening were not related to the recurrence of rapid eye movement periods ("paradoxical sleep"). Percentage time spent during the latter, and frequency of shifts of depth of sleep, did not differ significantly from the controls.

(ii) Heptabarbitalone greatly decreased duration of rapid eye movement (dreaming) periods and also the frequency of eye movements within those periods.

(iii) Heptabarbitalone decreased time awake, especially in patients in the early hours of the morning, and decreased frequency of shifts of sleep depth and frequency of body movement.

(iv) The EEG discriminated far better than body motility, which is subject to large individual variations.

(v) Body motility decreased according to traditional EEG stages of sleep depth, being significantly greater in association

with "paradoxical sleep" than in association with traditional "deep sleep".

(e) The Experimental Modification of Dream Content.

(i) Spoken personal names were incorporated into the dream events as indicated by the ability of the experimental subjects and an independent judge subsequently to match correctly names which had been presented during rapid eye movement periods with the associated dreams more often than would be expected by guessing correctly by chance alone.

(ii) Incorporation of emotional and neutral names into the dream events occurred equally often.

(iii) The mode of incorporation of the stimulus into the dream events was consistent with an interpretation of the function of the dream as protective of sleep.

(iv) Perceptual responses to the stimulus names, as manifested by subsequent dream recall, occurred without any observable differential associated electroencephalographic or galvanic skin responses from those occasions on which no such perceptual responses were evident.

(v) The frequency of recall of colour in dreams was higher than has been previously reported.

The results are discussed in relation to (a) the "depth" of sleep; (b) the hypothesis that the rapid eye movements are considered to be fixional movements appropriate to the dream imagery; (c) theories of a "need" for dreaming; and (d) perceptual processes during dreaming.

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APPENDICES.

APPENDIX A.

ACTIVITY OF THE VOCAL MUSCULATURE DURING SLEEP.

The initial hypothesis, prior to the observations on the tonus of the extrinsic muscles described in Chapter II, was that activity of the vocal musculature during REM periods would be related to dreams recalled following wakening in which the sleeper claimed to have spoken. This hypothesis could not be tested owing to the impossibility of differentiating activity which might have been a manifestation of sub-vocal speech from muscle artefact resulting from small mouth, tongue and facial movements unrelated to speech movements.

An attempt had been made to increase the sensitivity of the electromyographic recording apparatus by inserting a voltage integrator into the circuit, but this proved unsuccessful. It is possible that by the use of more sensitive apparatus, fine variations in activity of the vocal musculature might be detected during REM periods.

APPENDIX B

FURTHER DATA CONCERNING THE EXPERIMENTAL

MODIFICATION OF DREAM CONTENT

The Questionnaire

An outline of the questionnaire which was put verbally to the subjects follows:

1. Name
2. Age
3. Married/Single
4. Siblings
5. Occupation
6. Nervous troubles in self or family
7. Boy/Girl friends
8. Relationship with boy/girl friends
9. Incidence of dreaming.
10. Dreams equally/predominantly pleasant/unpleasant/neutral
11. Dreams in colour/colourless
12. Hypnagogic imagery
13. Visualiser/verbaliser
14. Deep/Medium/Light sleeper
15. Capable of self-awakening
16. Dreams predominantly visual/auditory/kinaesthetic
17. Recurrent dreams and/or nightmares.
18. Erotic dreams

The Dream Transcriptions (included at the end of this Appendix)

Transcriptions are given in full of all reports, following awakening during the/

the Main Experiment (Chapter VII), in which any reference was made to ongoing mental experiences prior to awakening however meagre such experiences might have been and regardless of whether the subjects considered them to have been fantasy or "thinking". In addition an example of a totally negative dream report (Transcription No. 47) is included.

Transcriptions of dream reports collected during the Preliminary Experiment which are referred to in the text (Chapter VI) are also given (Transcription Nos. 1-3).

Each transcription is preceded by the times of occurrence of:

1. the onset of the associated REM period;
2. introduction of the stimulus (together with the stimulus name and the number of times it was presented);
3. external disturbances (e.g. passing motor cars, motor scooters, etc.; which, to judge from the dream reports, were possibly incorporated into the dream events);
4. brief periods of C stage sleep during the REM period;
5. spontaneous awakenings;
6. final awakening on presentation of the high frequency tone.

Post-Experimental Impressions

The following transcription of a tape recorded account of subject K.J.'s post-experimental impressions is representative of the ignorance of the subjects regarding the true nature and purpose of the experiment.

E. I wonder now, on completion of the experiment, if you have any idea about what you think the aim of it is - the purpose?

K.J. The aim? Well, actually I had thought over this but I just can't - Well . . .
one/

one thing you were very interested to know if there was a consistency in my dreaming in colour, and very interested to know if there was actually conversation or if there was just, more or less messages transmitted by other means between the persons in the dream. I presume that this must have some significance in the meaning of the dream. I didn't know why you didn't ask more about a bit of background more than you did. Especially asking if, perhaps, some of the things in the dream had particular meaning. You know, having, perhaps, a correlation with something in life. But, on the other hand, not knowing exactly what you are after it doesn't necessarily follow.

E. So you wouldn't like to formulate a hypothesis about what you think I might be after?

K.J. Well, to be quite honest - I had actually formed an idea - I'm really a bit at sea here.

E. What idea was that?

K.J. Well, it seemed to me that because you weren't asking very much about background or as to how true the dreams were . . . you seemed to be more interested in obtaining sort of statistics about when dreams occurred, how long they occurred, whether a consistent nature or consistent colour, conversation . . . that sort of thing; whether one person has the same type of dream; do they vary? Basically the rate that one dreamed at, the length that one dreams. Seemed to be something more on those lines, but that was purely on the -

E. Sort of things I asked?

K.J. Yes. You not asking anything about everyday life which might convey a deeper understanding from the dreams. You didn't seem to be interested in the significance of the dreams, but this might of course not be valid . . . I/

. . I don't know.

Technical Details

A Brenell T.R.M.K. 5 twin-track tape recorder was used to record and play back the stimulus names and "white noise".

Intensity measurements were made using a Decibel Meter calibrated to read the voltage over the loudspeaker directly in decibels. The standard reference level was taken as:

$$0 \text{ db} = 1 \text{ mW } 0.775\text{V over } 1$$

The white noise was played at a level such that its intensity varied from -32db to -28 db.

The stimulus names were introduced over the "white noise" background so as to initially provoke a just discernible change in the EEG pattern (P.87); but as a guide, their intensity was within the range -42db to -28db (with no "white noise" background).

The bedroom, which was not sound-proofed, was separated from the EEG room by an empty room (as in all the studies):

The loudspeaker was placed about 3 feet horizontally and 2 feet vertically from the sleeper's head.

SUBJECT B.T.

SECOND NIGHT

6.44 a.m. Onset of REM period.

CATHERINE 2 times (6.48, 6.50)

6.54 a.m. Awakened by high frequency tone.

Transcription No. 1

E. Have you been dreaming?

B.T. Yeh. I'm standing in a river.

E. Standing in a river. 'Yes'?

B.T. It's a very shallow, stoney bottom, clear water and I'm in with Derek, that's one of my you know, in the flat. There are a few people around, they're not friends, just bystanders. We're talking about this stunt.

E. About what?

B.T. Talking about this, coming along here.

E. Oh yes?

B.T. The talk leads us round to a girl called Judy.

E. A girl called Judy?

B.T. Who's figured in my life as a sex partner. Anyway, we're talking about her and I go through my usual gambit 'it was bloody horrible'.

E. What were you saying about her, actually?

B.T. Oh, I start a gambit that she's a bit of a whore.

E. Yes.

B.T. I don't remember what I was saying about her. Anyway, one of my landladies comes into it now. Her name's Cameron.

E. Yes.

B.T. Or/...

B.T. Or else this was actually back at Mrs. Cameron's.

E. Sorry?

B.T. Or else we are back at her place and we were in her flat. What I mean is we were stopping there, that's where our digs are. We've gone back there. Then I don't know what happened.

E. You can't think of anything else?

B.T. There was a bit more. (long pause)

Morag comes into this somehow Yes, you and I are talking about Morag.

E. When is this?

B.T. It fits into the sequence. I'm probably standing in the river still, fishing or something. It jumps around from one thing to another. I'm talking about the rent for a start and Judy is supposed to be taking over Her boy-friend is supposed to be taking over the flat, and I'm saying he had better take it over, because if not I would have to move out within three weeks, or some definite period, one week, I think it is. Because we're broke. Derek says "Is this really necessary to move out?" and I say I'm not prepared to keep it going. Then I don't know where the hell this comes in but I'm now here, and of all the funny, bloody things, somebody comes in and scrapes my bollocks with a hair-brush. Can't remember where this fits in.

E. You can't remember which part of the dream this comes in?

B.T. No.

E. Whether it was before or towards the end?

B.T. It was towards the end.

E. It was towards the end?

B.T. It/...

B.T. It may well have been one of the last few things I was dreaming about.

E. You say, somebody comes in. Male or female?

B.T. Male. Probably you, but I can't put a face to it.

E. It was definitely male?

B.T. Yeh.

(a few seconds lost, owing to tape stopping, but unimportant)

B.T. Morag is the girl I am taking out at the moment and the girl I want to marry, you see. She's there, we talked about her. I don't know. Nothing's mentioned about her, she's just talked about, we don't mention anything specific, she's just part of my life. Whereas Judy is around, a temporary part of my life that I'm honestly regretting it.

E. How recent is she?

B.T. A year back.

E. You say it was a sexual relationship?

B.T. Yeh. Well, yeh! Only based upon a slight amount of friendship.

E. You mentioned once a girl called Catherine. Did she come before or after Judy?

B.T. I mentioned her in the dream, have I?

E. No, you didn't.

B.T. Oh! Catherine she came after er

E. I just wondered, when you told me the names of your previous girl friends you mentioned Catherine, not Judy, you stressed that Catherine was the

B.T. Catherine came after Judy. I was nuts about Catherine but I wasn't nuts about Judy.

E. Was your dream a colour dream?

B.T. Yes,/...

B.T. Yes, but not real colour.

E. What colour hair has Judy got?

B.T. Brown.

E. What about Catherine?

B.T. Black.

E. Black?

B.T. A deep enough brown to look black, not actually black.

E. You say you were standing in the stream?

B.T. Yes. It was only six inches to a foot deep.

E. With your shoes on?

B.T. Yes. Well I don't know what I was standing in. I know I was protected anyway. I wasn't standing there in unsuitable garments anyway. I've got great big boots on. Oh! I remember what happened right towards the end - Mrs. Cameron was walking towards me and she was coming down the river.

E. She was coming down the river?

B.T. And I was walking towards her, then I couldn't tell her that I wouldn't be able to pay the rent. All I remember is walking back looking at my footprints in the bottom of the river and Derek saying something about - I was imagining in the dream he was saying something like she wouldn't mind putting us up for a week free; but he didn't actually say it, I thought that was what he was actually going to say.

THIRD NIGHT/

THIRD NIGHT

6.00 a.m. Onset of REM period

MORAG 2 times (6.08, 6.10)

6.13 a.m. Awakened spontaneously.

Transcription No. 2

E. Are you awake, Brian?

B.T. I'm not a hundred per cent certain I've been asleep. Have I been asleep?

E. You're not a hundred per cent certain? You think you've been awake?

B.T. I don't really know. No I think I had some sort of a dream.

E. Can you remember it?

B.T. Yes. Mm. I dreamed I was in a sort of Newcastle mining village, the type you get in Newcastle. I was at the top of a wind-swept moor. Yes, yes I was dreaming, and somebody was questioning the village tobacconist.

E. The village tobacconist. Yes.

B.T. Yes and he was William, William somebody or something Williams, I can't remember what. They were questioning him on what various road signs meant it seemed to be connected with the war.

E. The war?

B.T. Oh yes! and somehow a French phrase comes into this, but I I've forgotten the connection with the French phrase for a minute. He's explaining one of the road-signs and I'm surprised how a tobacconist, a miner, being able to apply French to one of the signs. Then he explains another sign to me which seems to be in German. The funny thing/...

thing was that in the dream, of course, I thought it seemed to be German or French and now of course I can't remember any of the French or German. Anyway, that doesn't matter And we're standing on a bridge looking at a sort of square and first of all I see his shops close up, he has a lot of shops, two on the left and one on the right and then I see his shops as if from a distance and a great big sort of square of little tenements - no, not tenements - single-storey terraced houses, it appears that he's trying - everybody's talking and there's a family leaving and there's an old lady coming out and she's saying to the people that are going - now what was it? I was surprised at this, oh, more or less, "You go, you go, everybody go." and, "We'll be glad to get rid of you." and I'm surprised that why they should want to get rid of anybody, because that would mean that the tobacconist's shop wouldn't make any sales.

E. I didn't catch what you said she said at the beginning.

B.T. I've forgotten myself now. Oh, something like "YOU go, you go, we'll be glad to get rid of you."

E. "You" meaning?

B.T. The family that was leaving, and everybody. I could see her face quite clearly and she sort of swung round on me as well. She's quite an old battle-axe.

E. And then, was there anything else?

B.T. No. I don't think so.

E. You were very surprised by this?

B.T. Yes, I was surprised by the whole dream.

E. Why were you so surprised by the whole dream?

B.T. Well it was so vivid.

E. It/...

E. It was so vivid. Just the last part, first part, or the whole thing?

B.T. Well, the whole but first of all I seemed to be in enemy-occupied country, somehow I was questioning a Frenchman on the German type replacements, and roads, and things then it sort of switched to a Newcastle mining village.

E. And you were on a moor, you say?

B.T. Yes a sort of moor. The countryside around Newcastle is very bleak, and windswept, and moory.

E. And this tobacconist, when you were questioning him, it wasn't on the moor was it, or was it in the village?

B.T. When I was questioning him it seemed to me as though I was standing on a bridge looking at a little square, a little square on which I could see his two shops, kind of closed up. He had two shops on the left with a central door and one shop on the right. And then the scene switched as if I was seeing things as if I was seeing the scene far away. And obviously I was no longer on a bridge on any river, or anything, and I was just - I had moorland behind me. So I presume that I saw the dream in two different places, and somehow linked them together.

E. Fine. There's nothing else?

B.T. No.

E. And the last bit is rather important, was the woman saying "you go, you go," and something else. This doesn't mean anything to you other than in the context to the dream? You wouldn't like to try and interpret that yourself?

B.T. No, I haven't a ... no ... it doesn't ... no significance at all.

"Yes, you go, you go, everybody go, we'll be happy to get rid of you."

No?

E. That's/...

E. That's what it was?

B.T. Yes, yes, something like that.

E. Good. Now, what was I going to ask? You said she was rather like a 'battle-axe'?

B.T. No, no not really, she was pleasant enough, it was just that she had hard features.

E. She had hard features?

B.T. And she sort of seemed to be, you know ... I was surprised to see such a definite sort of woman, you know. Well, she had character of a surprising sort. I mean, it was surprising to see a woman who was ... I suppose there was I don't know (indistinct mumble)

E. Pardon?

B.T. I'm trying to think exactly what I mean. Well it surprised me to see a woman there rather than a man.

E. I see.

B.T. Because it wasn't really her place to, I was surprised because I couldn't see her connection with this chappy - whatever his name was ... Williams or ...

E. She sort of seemed to intrude?

B.T. Yes, yes. But she fitted in with the whole dream. She was

E. She had character. On the whole your impression of her was what - good or bad?

B.T. Vaguely bad.

E. Vaguely bad?

B.T. But there was some funny business there now. I was surprised in the dream because I thought there was something fishy. And I couldn't work out why everybody was so glad to be getting rid of the families to/...

to wherever they were going.

E. Good. It would be interesting to ask - you said last time about your relationship with Morag, that things weren't so good that last time, and you'd had a row and then things were alright, you thought. They've stayed alright since then, have they?

B.T. Yes, everything's fine with that relationship.

E. There are no undercurrents?

B.T. No. Well, there is one obvious undercurrent, that she is a very dominant character.

E. She is very dominant?

B.T. Well, not over me, but she is a dominant character, you know, she needs a firm hand.

E. She needs a firm hand? In other words to increase the dominance over her, you mean?

B.T. No, well its I don't know how to put it. Well I don't know what I mean.

E. Well, you wouldn't say (this might be pushing it), you wouldn't say in this dominance there was any connection between her and the woman in the dream?

B.T. Where? No, when we were talking about it I was seeing if it could apply to Morag, but I don't think it can.

E. Yes. Fair enough.

B.T. I was more and more inclined to have thought it was my mother, rather than Morag.

E. Good.

SUBJECT K.M.

FIRST NIGHT

- 7.35 a.m. Onset of REM period.
7.42 REBA 26 times
7.46 Awakened by high frequency tone.

Transcription No. 3.

E. Have you been dreaming?

K.M. Yes.

E. Can you remember it?

K.M. Yes, vaguely, now let's see. I'm striding through a ballroom where I've just had an angry word with ... somebody ... a girl. I'm striding out of the ballroom. Now let's see what's it about? For a minute I remembered what it was all about, but I can't remember now, at least I thought I remembered what it was all about. I can't remember much detail here at all I'm afraid.

E. Well as much as you can, it might come back.

K.M. Well, as I say, there's a big room, it's bright and the girl who's the person talking is dressed in white, sort of Regency, very long flowing, satin white. And I've been having (.....?) and I'm just striding out past - through the hall, into the hall and going out, but not terribly angry, but it's angry about something, but not violently angry.

E. You don't know what you said to her?

K.M. No. It's about something else, about somebody I think. That's about all I can remember.

E. Can you remember what the girl looked like?

K.M. No./

No. Completely amorphous. I don't think I ever knew.

E. But was she dressed in white?

K.M. Yes. She was tall with this - I mean out of context it would be fancy dress.

E. I see.

K.M. And I was dressed myself in the appropriate period costume.

E. The dream was in colour?

K.M. Yes.

E. And you, sort of, described the dress as Regency.

K.M. Yes something like that, yes.

E. You can't remember anything before that?

K.M. No, I'm afraid I can't. I realise I have been having a full dream, but I just somehow Then I wakened and I've gone and forgotten all the things.

SUBJECT P.M.

FIRST NIGHT

- 6.50 a.m. Onset of REM period.
6.55 JENNY 22 times.
6.59 Awakened by high frequency tone.

Transcription No. 4

E. Have you been dreaming?

P.M. No, not really. I haven't been asleep I don't think, not deeply.

E. You don't think you've just been dreaming?

P.M. Yes, I have. Talking to a child - can't remember where - or a group of small children and I think they were having a meal actually and one told me not to take things too seriously and that was all. Was a very brief encounter ^{and} ~~then~~ then you wake me up.

E. Just now?

P.M. Yes.

E. It was one of the children?

P.M. It was a little girl.

E. What can you remember about her? Was it visual?

P.M. Yes she was on my right and I think she had dark hair and I think she had a mug in front of her, there was something in front of her. But, there were some of her mates, rather small girls to the left of me, but more than that I don't think I can remember.

E. You don't know where it took place?

P.M. It was just a room with a table as far as I was concerned.

E. And the girl said to you, can you remember the exact words?

P.M. Don't/

Don't always be so serious - that's right.

E. Did you say anything?

P.M. I didn't get a chance, no.

E. Did she have a name?

P.M. She may have done but I don't know.

SECOND NIGHT

5.17 a.m. Onset of REM period.

5.25 ELFRIEDE 17 times.

5.29 Awakened by high frequency tone.

Transcription No. 5

E. Have you just been dreaming?

P.M. Yes.

E. Can you remember what it was about?

P.M. Standing outside the Art Gallery here in Edinburgh, talking to somebody. About stealing. Who it was I don't know. I can't remember, it was a male. That's about all I can remember.

E. You said you were talking about stealing, stealing what?

P.M. Well, that I don't know. I sort of have an impression that the conversation was about stealing.

E. You can't remember any words?

P.M. One has an impression of what the conversation was about without anything being said. Presumably about pictures as we were outside the National Gallery.

E. You can't remember anything more?

P.M. No.

E. Not/

E. Not even the person you were talking to?

P.M. No, except that it was a male.

E. How long would you say you were talking to him?

P.M. Fractionally.

E. A very short time?

P.M. Yes very short.

6.44 a.m. Onset of REM period.

6.49 JENNY 10 times.

6.53 Awakened by high frequency tone.

Transcription No. 6

E. Have you been dreaming?

P.M. No, I don't think so. No, no, not that I can remember of, anyway.

E. You can't?

P.M. Why, should I have been?

E. Well, just think a few moments.

P.M. Oh yes. Again it was something to do with stealing. Something to do with robbing a safe. With a jemmy.

E. With a jemmy?

P.M. Yes. And I was being inveigled to do it by somebody else, or at least asked to take part. I can remember something or other happened and he disappeared. I don't know quite how or why. It was a bit of a mix-up I think. Then I banged the under-edge of the table with the jemmy and you woke me up.

E. Uhuh. Where did this actually take place?

P.M. Well I don't know where the place was, but the table looked remarkably like the one that is in our kitchen.

E. Uhuh. Can you remember the person with you?

P.M. NO/

P.M. No, I don't think so. The person with me was behind me.

E. I see, and he was male was he?

P.M. Yes, male.

E. There's nothing more the first thing you can remember is talking about stealing?

P.M. Yes. It was breaking open a safe somehow.

E. That's the first thing you can remember in the dream?

E. Yes. And the only action you can remember is ² banging the -

P.M. Well there was an argument between the two of us. I don't know quite what about, I think there was dishonesty but I can't remember how that fitted in. Anyway, he disappeared, the next thing I was sort of .. doing the banging the under-edge of the table, one of the corners of the table with a jemmy.

E. Was it in colour?

P.M. The only thing that was in colour was the jemmy. That's right, I know, a sort of red. But whether in point of fact it was in colour or whether I knew this jemmy was red I don't know. I had the impression of the jemmy being red.

E. That's the only thing you can remember in colour?

P.M. Yes.

E. I didn't remember to ask this last time actually but I don't know if you can remember the first dream?

P.M. No, again it .. there wasn't an impression of colour.

E. There wasn't. But the jemmy was in colour here.

P.M. Yes. Well, I say it was in colour because I knew the thing was red. And it seemed to stand out almost, because of that.

E. Good. Nothing else?

P.M. No.

THIRD NIGHT

- 3.11 a.m. Onset of REM period.
3.16 C stage (no REMs)
3.20 B stage with REMs
3.25 SHIRLEY 3 times
Awakened by the final stimulus.
3.27 High frequency tone.

Transcription No. 7

- E. Have you been dreaming?
P.M. Yes, I think so. I've been trying to recollect what I have been dreaming.
E. You just woke up a few seconds ago didn't you?
P.M. Yes, something woke me up, I thought I heard something. But I don't know what I have been dreaming about, that's the point. All I can remember is having the image of a rectangle in my mind, and inside the rectangle was stercobilin
E. Was what?
P.M. Stercobilin, the word.
E. Spell it.
P.M. Sterco -- s-t-e-r-c-o-b-i-l-i-n -- and underneath it was stercobilinogen - the same word again with o-g-e-n at the end of it.
E. These words have no meaning?
P.M. Oh yes. They .. er .. yes, I am sorry about that. They are two types of compounds that you get in urine from blood breakdown.
E. I see. Was there anything else?
P.M. That's all - that's all I can remember.
E. You saw these inside the rectangle?
P.M. Yes/

P.M. Yes ... sort of an abstraction, there's no surrounding.

E. In colour?

P.M. No.

E. Not in colour?

P.M. No.

E. And what were the words once more?

P.M. Stercobilin and stercobilinogen.

E. And nothing else? You don't know where it was? It was just an abstract thing?

P.M. Yes.

E. You say that something woke you up?

P.M. Yes, I thought it did. I thought I heard a noise.

E. It wasn't a dream or anything?

P.M. No. I thought in fact, actually, that you had woken me up. You see - nothing more happened and I thought it must have been something outside.

E. No, I didn't do it, as a matter of fact. Well ...that was it then?

P.M. Mm.

E. Right.

4.46 a.m. Onset of REM period.

4.56 LAURA 19 times.

5.01 Awakened by high frequency tone.

Transcription No. 8.

P.M. A small ulcer.

E. Pardon?

P.M. I dreamt about a small ulcer.

E. A small ulcer?

P.M. Yes, /

P.M. Yes, on the inside of the lip, lower lip.

E. Just a second, actually I forgot the knob was off. You just started with that now, did you?

P.M. Yes.

E. When you said that you dreamt of a small ulcer?

P.M. Yes, that's right.

E. Good.

P.M. On the inside of the lip, lower lip. I was talking to somebody about it and how it was caused.

E. Yes.

P.M. Somebody squeezed it. I don't know whose lip this was, by the way. It was neither mine nor the other fellow's - the other person's rather. Somebody squeezed it and a comment was made about it.

E. Yes.

P.M. (long pause) I can't remember what that comment was, it was sort of semi-medical, you know.

E. Yes.

P.M. He went on to the back of the throat but I didn't see the back of the throat. I was going to see the back of the throat, you know, as a sort of next example, but I didn't get that far.

E. Where did this take place?

P.M. I haven't a clue.

E. You don't know?

P.M. Well, it was sort of in isolation again, you know.

E. What were the things you actually saw then?

P.M. The small yellow ulcer, yes.

E. And you don't know who the person you were talking to was?

P.M. No.

E. Well./

P.M. No.

E. Well, that's O.K. There's nothing else - was it in colour?

P.M. Well - yes, it was, actually. That was why I knew it was a yellow ulcer, now I come to think of it.

6.04 a.m. Onset of REM period.

6.16 SHIRLEY 17 times.

6.21 Awakened by high frequency tone.

Transcription No. 9.

E. Have you been dreaming?

P.M. Yes. I dreamed I was in hospital - as a student, you know - and I went to see ward patients. I can't remember anything about that. And I came back after having looked at the patients and I went to see the sort of boss or lecturer, and he brought me into a side room, a small room with a few patients - and I noticed, or rather I felt, that the stethoscope I was carrying seemed rather bulky. Well, I walked into the side room and one fellow near the door was lying on his face and the lecturer thought he had been treated with oil, presumably for constipation. I think - he was raised up on pillows on the bed rather than on the bed. Anyway, I walked in and walked round to the other side - to the corner

E. You what?

P.M. I walked into the room and over into the corner and, as I did so, a bedpan from somewhere or other fell on to the floor. Well ... I looked at it and didn't know what I was to do, whether to pick it up or leave it or do what, and I went over to it in the end and found there were two. Well, it was then that you woke me up.

E. Two/

E. Two bedpans?

P.M. Yes, on the floor.

E. Was that all? Were they full?

P.M. Yes, one was - no, both of them were, both of them were.

E. What were they full of?

P.M. Well, you know, dried muck and so on.

E. Pardon?

P.M. Well - they had been used.

E. I see. Did you think of them in any particular way?

P.M. Did I think of them in any way?

E. Yes.

P.M. Well - no, not really. I mean .. yes ... well, the only thing was what was I to do, you see, being in a bit of an awkward position, you see. I mean, being in the room and having seen this occur and not being able to do anything about it was a bit embarrassing with the other fellows there. There were three people in the room, three patients.

E. I see.

P.M. And one of them made some comment about this when this bedpan suddenly appeared as if from nowhere as far as I was concerned.

E. And what was the comment, do you remember?

P.M. Something about it being a lot of wind.

E. A lot of wind?

P.M. Yes.

E. Was that all? You can't remember your actual thoughts on seeing the bedpans?

P.M. Well - it went something like this. If I was working here, I should have/

have to clean it up.

E. Yes. What did you think of it?

P.M. I only thought ... my only definite thought was that

E. I don't want to put words into ... you know ...

P.M. No - quite.

E. I want you you know ...

P.M. My feeling about the whole thing was reasonably negative except for the part about this patient who was embarrassed, and I tried to sort of get over it in such a way as to make it appear almost an everyday occurrence.

E. Yes.

P.M. And appear master of the situation, itself.

E. Yes. Well, if I could put it in your ... I mean, when you saw these bedpans on the floor, did you sort of think, "Oh, that's shit all over the floor" - that sort of thing?

P.M. No - not really.

E. You didn't think of the word 'shit' even?

P.M. No.

E. You didn't. Oh! That's good.

P.M. No, it wasn't that at the time that I was so concerned with. I didn't know at the time whether they had been used or not.

E. I see.

P.M. ... but I went over there and I saw they had been.

E. Yes. So you didn't think about shit?

P.M. No.

E. You just thought, "Oh, they have been used"?

P.M. No/

P.M. No ... well ... I thought it was all rather unfortunate ... as I say ..
in the dream, this fellow was a bit embarrassed.

E. Yes?

P.M. Not that I saw his embarrassment, but I sort of knew ... knew
instinctively in the dream that this person was embarrassed and it
was that, rather than the actual situation itself

E. I see. Did you know instinctively that the bedpans had been used ...?

P.M. No, no. I didn't know. In fact, before that ...

E. I mean, when you saw it, you actually saw it?

P.M. Oh yes.

E. I see. Yes. Was it (the dream) in colour?

P.M. ...no ... no. I don't think so. In fact, I cannot remember any-
thing that was in colour. The only thing I know - the bedpans were
silver ... steel, you know ... metal, you know. And I've got a
strange feeling ... not a strange feeling at all ... but I've got a
feeling it was ... it was something to do with the Margaret Rose.
Not that I recognised anything except possibly the bedpans, but then,
they have the same sort of things up there, but almost intuitively,
you know ... I thought it was an orthopaedic hospital.

E. Yes?

P.M. By the way the patients were lying.

E. Nothing else? One of them commented and said, "There's an awful lot
of wind"?

P.M. Yes .. well, .. I mean ... a comment of that nature ...

E. You can't remember the exact words?

P.M. No.

E. You can't think of anything else?

P.M. /

P.M. ... Just previous to that, I had this dream - it's a dream I have had several times - of a long building ... ground floor, first floor, second floor, and it's supposed to be (as I found out this last time - in my dream, this is) a hostel for students up here ... and apparently, they took a long time building this ... and they've made a sort of hash up of it, you know .. there were turrets and things - which were completely out of place ... and the stonework outside was in the same sort of stonework that you get in the Royal Infirmary, you know, and those little turrets every so often. Well, the thing was completely ridiculous - long and low, made out of red brick and I was with somebody .. but I don't know who it was but I think it is a fellow I know in the Faculty - his scathing comment which, though I laughed at, I didn't quite follow, was "They have even used rafters for the roof."

E. He said, "They have even used rafters for the roof"?

P.M. Yes. By the way, the building was not in itself in completion, you see - it was being built, but it had the walls up and it had the floors in and the roof on - or most of the roof - I mean, this was his comment, "They have even used rafters for the roof", which I sort of laughed at politely, but I didn't know what I was supposed to make of it.

E. I see.

P.M. Being a flat roof, you see - not the sort of pointed peak roof. I have an idea it was somewhere behind ... It was up here in Edinburgh, but I didn't recognise the place. It was in a side road with ... it was dark, you know, it was not a very well lit place. Whether there were trees or whether it was overcast, I don't know. But it was somewhere behind the University, the Medical Faculty, why I don't know. I think it was just an association more than anything else.

E. /

E. This remark rather surprised you, did it?

P.M. What - about the rafters?

E. Yes.

P.M. Yes .. well, I mean ... it seemed a bit of an inane remark to me. I would have been surprised if they hadn't used rafters in the roof .. and ... I don't know ... I sort of tried to figure this one out. I didn't want to argue with the fellow because I didn't know quite what to argue about. I sort of laughed .. well, politely and went on.

E. This dream preceded the other one?

P.M. Yes.

E. And the first thing that happened in the other one was ... well, the last thing that happened in that dream was this chap making the comment, was it?

P.M. wait a minute now

E. The last thing in that dream and the first thing in the other that you can remember.

P.M. ... (very long pause) This fellow made the comment as I was over there - I think it was as I walked over to the bedpans, and the last thing that happened was walking back to the place I was originally standing at, near the window in the other corner of the room. And I think the first part - - - in the first dream - this is the other way round, I have told you the dreams the other way round - was walking down outside this long, low building, and sort of looking at it and being informed what it was going to be; then this comment about the rafters; and then we carried on and took notice of the turrets and the odd, gimmicky things ... which seemed, as I say, rather out/

out of place for a hostel. And then a bit of a break and I went into the dream that I told you about first.

E. Right. Good. Nothing else?

P.M. No.

FOURTH NIGHT

3.11 a.m. Onset of REM period.

3.17 LAURA 18 times.

3.19 Awakened by high frequency tone.

Transcription No. 10.

P.M. I can't remember anything. The only thing I can remember is a small paper flag, you know, like the ones they sell in Princes Street during the mornings, you know. Those came into it but I can't remember anything more than that.

E. Is that all?

P.M. Yes.

E. You can't remember anything else - you just remember seeing it, or what?

P.M. Yes, I remember seeing them - stuck into something - two of them.

E. Were they coloured?

P.M. ... mm. ... no, I think they were black and white actually ... I think so ...

E. That's all ... ? Anybody else? ... or ...

P.M. No. There was more but I just can't remember it. I had the feeling when I was waking up of saying to myself, "He is waking me up too soon," you know. And I couldn't get hold of the dream. It sort of slipped away from me.

E. I see. You sort of felt I was waking you up too soon... the thing had/

had not got started, that it hadn't been going on long enough?

P.M. Quite. And that I that I couldn't retain enough of the dream - that I couldn't get hold of it.

E. I see. Because it had only just got started, you mean?

P.M. Well ... yes ... well, yes ... presumably ... presumably so.

E. And yet, there was a lot more than ... well, you know ...?

P.M. No. I knew there had been some already, you know, and that I had gone on, but it's just I feel there wasn't enough, there, to hold onto and what there was would slip away.

4.21 a.m. Onset of REM period.

4.29 JENNY 14 times.

4.32 Awakened by high frequency tone.

Transcription No. 11

E. Were you dreaming?

P.M. Yes. Yes ... quite (very long pause) ...

You know, it's funny, the reaction is much the same as it was in the last one. I felt you woke me up too quickly. All I can remember is .. that ... you know, this feeling is ... of a white scarf ... and somebody in bed. I don't know whether it was me or not; it might well have been, but just a sort of white, square scarf, silk scarf. Very prominent. I can't remember anything else ...

E. This being in bed - you don't know if this was you or somebody else?

P.M. I have an idea it was me, but it may have been somebody else.

E. You don't know if you were .. sort of observing .. ?

P.M. No.

E. It was somebody you were observing, was it?

P.M. Oh yes, there was somebody in bed?

E. Yes/

E. Yes You can't remember anything more?

P.M. No.

E. The silk scarf - you just don't know where that came in ?

P.M. Where it came in? I recognised the scarf.

E. You recognised it?

P.M. Yes. One of mine.

E. Oh! It was one of yours?

P.M. Yes. Well ... I had one like it. This square ... a bit tatty now, and ... with a fine black line running through it at regular intervals, and I recognised it from that. But what function it had in the dream I don't know. I just saw it ... don't really remember.

E. When you say, you know, "you woke me up too soon," I mean, did you feel that you came out of it gradually?

P.M. No - rather quickly.

E. Rather quickly? You mean that when you woke up, you woke up quickly?

P.M. Yes.

6.00 a.m. Onset of REM period.

6.10 LAURA 29 times.

6.13 Awakened by high frequency tone.

Transcription No. 12

E. Have you been dreaming?

P.M. Yes (long pause) There was a man's head, down as far as the root of the neck ... that's all I could see; it must have been a man in his 30's.

E. Pardon?

P.M. I say he must have been in his 30's. His hair was slightly receding I don't know any more about him ... no his features were thick/

thick slightly wavy hair (very long pause)..... where it happened, how it happened, whatever it was, I don't know. I can't remember anything more.

E. That's all?

P.M. Uhha.

E. You don't know who it is - does it resemble anybody?

P.M. No, it doesn't resemble anybody I know.

E. Did he say anything? Did you say anything?

P.M. No.

E. Was he looking at you?

P.M. Well ... no, .. he wasn't actually. He was looking straight ahead ...
..... Now, wait a minute it's coming back to me now Yes, yes. Before that, I'd dreamt that I was walking from Newquay (that's my home town, you see, in Cornwall) to London, no, not to London, to Plymouth, with a pram. Apparently I had already walked from London down to Cornwall with this. Well I took a long route up the A 30, and when I got to the border, there's a river there ... well, the bridge had gone and there was nothing but boulders across ... and Carol, who is a sort of sister to me, was with me ... and the two of us tried to manhandle the thing across and ... wait a minute ... I (inaudable) and got my feet wet. She came back to help me but we got the thing positioned in such a way that we couldn't move it. Somebody else wanted to cross over. They gave me a man about 30ish, I suppose. I can't remember what he looked like, and he started giving us a hand. Well, by this time, my trousers were soaking and I slipped a few times. There was a piece of wire netting going from one bank to the other, with no function at all really - so I grabbed hold of that. And then the scene/

Scene changed a bit. It was still in the same place but on the north bank - on the Devon bank. There had been a mass of excavations - sort of clearing the ground on the road, and I was talking to somebody - but I don't know who they were - and they were saying that ... well, they made this comment that the contractor had said "build low", so they started building the bridge low, this new bridge they were going to build, and built it so low that they couldn't get it above the river level, or something. And I could see .. sort of ... the first part of the bridge away, away in the distance, very much farther away than it ought to be. Apparently, they had given that up and they built a large wall on the bank, it looked like crazy paving and there was quite a large area of ground which had been sort of ploughed up and cleared, a couple of hundred yards wide sort of ... a long strip, you know, curving gently round the meander in the river. And again somebody said to me - and I don't know who it was - how ridiculous it was that a large strip of ground whereas the actual roadway that they were going to build - it was about 20'0" wide. And another odd thing - the proposed bridge they were going to build - the new one - was at right angles to the road they were going to build I think it was in colour; yes, it must have been because the earth was sort of dark brown red, and the sort of .. the pier head of the bridge was bare concrete, it appeared white but I don't think I can remember any more.

E. Where did the man with the head come in?

P.M. Quite .. where did he come in? I don't know. I doubt ... the only thing I can remember at the time. He still doesn't fit in anywhere, this was the last bit, of that bit of dreaming.

E. I/

E. I see. He was just in this dream now, was he?

P.M. Yes ... yes.

E. Fine. And the people who spoke to you - you can't remember whether they were male or female?

P.M. Well .. they were all male this time.

E. All male?

P.M. Yes.

E. You can't remember the exact words they said?

P.M. No, I can't remember the exact words. But I know he reminded me of somebody, and that's my landlord, because he's an architect and it was his sort of way of commenting on duff architecture, the way this fellow spoke, you see, and the tone he used.

E. What sort of tone was it?

P.M. Well ... you know ...

E. Can you imitate it?

P.M. No, I can't. I have often been tempted but I can't do it ... you know the sort of slight annoyance at people's idiocy ... you know not irate but more annoyance and surprise you know, that people could make a botch of something when they've got all the materials and labour they want.

E. And you didn't actually think it was him, or did you?

P.M. Well ... I don't know. I think it was him - but it wasn't that it looked like him, it just sounded like him, but I didn't see this fellow at all, the fellow that was talking to me. It presumably could have been him, you know.

E. Anything else?

P.M. Well ... this place I dreamt about, the only interest it had is that it/

it is on the border between Devon and Cornwall, and that the road - the A.30 - at that place there's a double bend, a bridge and a steep hill, and it was ... you know ... a very dangerous part of the road, and it was a sort of talking point every time I crossed that place. They have been talking for years about doing something about it but I can't see any other connection ... you know ...

7.16 a.m. Onset of REM period.

7.24 JENNY 20 times.

7.27 Awakened by high frequency tone.

Transcription No. 13.

E. Been dreaming?

P.M. yes ... yes it was about some cheques .. that belonged to me and it started like this, as well as I can remember...

I must have been at home, I think - and I went down to the local garage to get some money or a cheque or something and the fellow who was working there asked me if I had ever picked up my National Insurance cards - and it was about four years ago that I worked there - and I said, "Well, I may have done but it doesn't make any difference one way or the other," and I said "Why?" ... and he said, "Well, someone had said something about this." And I had a look at the card, and then there was nothing but cheques that had been used but they hadn't been filled in by me ... nor had any of them been dated I looked at a few of them (inaudible) interested in cheques (inaudible) I said (inaudible) and that was virtually it.
(then long pause)

E. Anything else?

P.M. No, I don't think so.

E. Do you remember any words you said, or he said?

P.M. No/

- P.M. No not exactly, no, just talking, you know.
- E. You can't think of?
- P.M. Something specific?
- E. Yes.
- P.M. No.
- E. What was the last thing that happened then, exactly?
- P.M. Well, I think the cheques, and I saw that the date on them hadn't been filled in - but you know how you can number 196 and fill in the last digit yourself? Well, this was 1930 and 1920, which was a bit out of my own time. I wasn't around at that time.
- E. They were 1930 and 1920?
- P.M. Yes.
- E. How many were there .. I mean, .. do you think you saw?
- P.M. Well, I looked at four or five - there was a small block of them, you know ...
- E. Uhha. And they each had different dates?
- P.M. Well, none of them were dated - you see, that was the point. The date numbers on the cheques were 1931 and 1921, you see, but the date itself hadn't been filled in.
- E. I see I see How many would you say there were, that you saw?
- P.M. Well, I looked at four or five .. there may have been 10 .. 12.
- E. Nothing else? Were they in colour?
- P.M. Well, the cheques were yellow, but the rest of it was in colour .. I'm not certain ... I think it may well have been .. but the cheques were certainly yellow.

FIFTH NIGHT

3.50 Onset of REM period/

FIFTH NIGHT

3.50 a.m. Onset of REM period.

4.01 ELFRIEDE 15 times.

4.04 Awakened by high frequency tone.

Transcription No. 14.

E. Have you been dreaming?

P.M. .. I have .. Yes.

E. Can you remember it?

P.M. Well, I can remember part of it. I was in bed, and ... I was trying to remember ... as many words beginning with K, A, double F ... and I seemed to be able to remember, you know, several - the only one I can remember recalling was Kaffa.

E. Kaffa?

P.M. Yes, Kaffa.

E. How do you spell it?

P.M. K - A - double F - A

E. Oh, Kaffa. Yes.

P.M. It doesn't mean anything to me I was on my own, I think .. you know, it's I think I was on my own.

E. How many words were there?

P.M. Well, as far as I can remember oh, wait a minute, I can ... one, two there were seven.

E. Seven?

P.M. Seven or eight anyway.

E. Yes.

P.M. And I had an image of them as if they were in a cartwheel fashion, you know. That was the image I had in the dream. Otherwise, I can't remember anything. I think possibly I may have had a dictionary with me, /

me, you know, but I didn't use it.

E. What were the letters again? Can you remember them?

P.M. Well, the first four letters were K, A, double F.

E. K, A, double F?

P.M. Yes.

E. These were the first letters of four different words?

P.M. Yes.

E. Double F? That was the beginning of one word, was it?

P.M. No ... wait a minute ... no. Each word began with that. It is the beginning of seven words, you see, and it was just the terminal part of the word that differed.

E. Oh, I see. C, A, double F?

P.M. No: K, A, double F.

E. It was the same on?

P.M. On all of them, you see. It was just the terminal part of the word .. that differed. The only one I can remember is Kaffa, K, A, double F, A.

E. Which doesn't mean anything?

P.M. It doesn't mean anything, no. No, it doesn't mean anything.

E. And none of the other words mean anything?

P.M. Well, I can't remember them, you see - that's the point. They seemed to have significance in the dream.

E. They seemed to have no significance?

P.M. No - they had significance in the dream, but I can't remember them.

E. Yes and this general sort of ... well, that was all?

P.M. Well, I mean, there was more but that's all I can remember, you know.

E. Which word was Kaffa do you think? Near the end or beginning?

P.M. Well, the point is it wasn't anywhere there was neither end nor beginning/

beginning and the image was of a sort of clock-face, with the words all radiating from the centre.

E. Was it in colour?

P.M. No no, the only thing was, the words were in dark black, you know, Indian ink black.

E. I see. And you were in bed at the time?

P.M. Yes.

E. .. Well anything else? Anything else that you can think of?

P.M. No. I know I dreamt more than this.

E. Yes. O.K. then.

5.01 a.m. Onset of REM period.

5.10 SHIRLEY 17 times (short bursts of alpha rhythm following stimuli on 3 occasions).

5.14 Awakened by high frequency tone.

Transcription No. 15

E. Have you been dreaming?

P.M. Yes, I dreamt there was somebody repeating something Shirley by name presumably at night This was supposed to have some reaction on me.

E. Pardon?

P.M. I said, this was supposed to have some reaction on me.

E. Uhha.

P.M. I must try and get this straightened out (very long pause)
I think it was and there was some congregation of people.

E. Yes.

P.M. No - I can't remember where or what for. Some of them I knew, and ... it ended up that I signed away 1,300 quid ... to somebody doing something which I was particularly interested in anyway. I can't remember what/

what all this was about It was night time and the night was very dark, so presumably it must have been ... well, ... after supper anyway. I found myself in the High Street, at one point .. with .. but I can't follow this dream at all ... sort of dotted around here and there. This is a very garbled version of something that was rather logical when I was dreaming it, and

E. The whole thing was logical?

P.M. Well, it appeared logical when I was dreaming it. I sort of followed it adequately enough. It seemed to make sense. Put it that way.

E. Mmm. It started off with - what was it? Somebody repeating .. ?

P.M. Oh, Shirley. That's right, yes! I wasn't supposed to hear this. I was supposed to be asleep.

E. Yes?

P.M. And they were hoping to find out what effect it had on me. The thing was that I heard this, for every time I woke up, of course, they stopped. Then I was cute enough to wake up without appearing so

The next thing was I found myself somewhere else, you see

I don't know whether it was in the High Street or in this gathering, or what. I can't make any sort of story out of this, you know. I can't sort of make it follow on logically at all. I was sort of signing away thirteen hundred quid. Yes, that was it - I sort of regretted it afterwards.

E. You regretted what?

P.M. Well, I signed away thirteen hundred quid for something or other .. I mean, thirteen hundred quid thirteen hundred quid, you see, and it was something very small, somebody did something. A minor - then afterwards I sort of regretted it. In fact, it was rather odd the way I signed it away. We were - there was a group of us and we had to write down something ...

E. Yes?/

E. Yes?

P.M. ... in relation to a phrase we had been given. I can't remember the phrase but the sum total of this was that I sort of signed away I said, I'll give £1,300 to some cause, or charity or something, if somebody, one of the group or one of the people there, would do something. And then someone came round - a woman came round - and collected all these individual pieces of paper - everybody was doing this, writing something on a piece of paper - and or wait a minute there was a girl involved - it's coming back to me now - yes, it was more of a dare than anything else, that she would do something. It was aimed particularly at one person though it applied to everybody. But if she would do something, which I can't remember now, and it wasn't particularly difficult or obnoxious, as far as I can remember, she'd get the thirteen hundred quid. If she didn't get it, then charity would. I don't know.

E. I see.

P.M. Well, the thing is I can't stand this girl, quite frankly.

E. How .. ? Who ... ?

P.M. Oh, it is a girl I know. She's in our year.

E. I see.

P.M. She's rather talkative at the top of her voice, you know ... and ... you know. It was rather a pleasant dream in spite of all this.

E. What's her name?

P.M. Anne.

E. Anne? What is she like physically? Attractive? Unattractive?

P.M. Well ... she has her moments. You know, dark haired, sort of ... well, the thing was ... that annoys me about this particular person is that she is very, very ... egocentric .. you know ... you can see she is always in/

in the centre of her own sort of world. She is very, very much the centre of her own world and I sort of ... I can't remember what this dare was about .. you know ..

E. Yes. Who made the dare?

P.M. Oh, I did.

E. Oh, you did.

P.M. Oh yes .. you ... if you do so-and-so, you know, it'll be worth thirteen hundred quid to you.

E. Yes.

P.M. Well ... you know ...

E. Getting back to this Shirley business. Do you know anybody called Shirley?

P.M. No.

E. You were asleep - you saw yourself asleep, did you?

P.M. Well, the thing was, you see, that I was supposed to .. and I think I know how it came about .. or the possible explanation. Somebody was telling me that they were through an experiment like this. I mean, this was weeks ago ...

E. Yes.

P.M. .. and that the person concerned played back the name of the girl friend, you see, over the inter-com.

E. What? The subject?

P.M. Yes, the girl friend's name was played back to him, you see, and I think it was something like this, from the fact that I don't know anybody called Shirley at all.

E. I see. Then what? Did you ... this was in your dream?

P.M. Yes.

E. The dream was that somebody had this -

P.M. Oh,/

P.M. Oh, no. No. I was told about this - I mean, this is gen, you know.
This was daytime stuff.

E. Oh, I see.

P.M. I was told about this.

E. Yes.

P.M. I don't know quite when, but it was a few weeks ago, and it was something like this, that this was being repeated to me, in the same way, to see what effect it would have on me.

E. Yes. and you thought you dreamt about this?

P.M. Yes, I dreamt about it. I dreamt ... well .. I was sort of listening to it, and every time I woke up it stopped, you see, because they didn't want me to hear what was actually being repeated.

E. You say they. Who's they?

P.M. Well, I mean, I presume there was more than one person there concerned in the whole business. I didn't see anybody, I was completely in the dark.

E. Uhha.

P.M. I just lay there with my eyes closed and listened to it, you see.

E. Mmmmm.

P.M. And then, of course, you see, all this business of meeting and finding myself in the High Street at night.

E. Mmmmm. Yes ... Fine .. Who's - this interests me - this stuff you say you heard, somebody playing .. things ... was this supposed to be me?

P.M. It may well have been actually. I didn't dream about it as ... but it was in the same sort of setting, you know.

E. I see. But you heard something about somebody playing names?

P.M. Yes. I don't know who told me but somebody said that one fellow that was doing it had his girl friend's name played back to him. Well, I didn't take much notice of this and it could have been true, or it needn't have/

have been true - but every time he was going to be woken up they stopped so he never knew that this was being played to him. I think it was (inaudible) this sort of setting, you see.

E. I don't know where he got this from.

P.M. Well, quite. I didn't say yes or no to it, just sort of ... It was rather ingenious, the effect was ... this was supposed to have some effect on me in the dream. Well, I suppose it must have had effect because I found myself in all sorts of places. I mean, there was quite a bit more to the thing but I have forgotten it because I can't link it up, you know, I can't make a story out of it.

SUBJECT C.S.

FIRST NIGHT.

5.33 a.m. Onset of REM period.

5.43 a.m. LESLIE 5 times.

Awakened by the final stimulus.

5.45 a.m. High frequency tone.

Transcription No. 16.

E. Right, that's it.

C.S. I don't think I can remember the beginning very well.

E. No. We can start again.

C.S. Start again?

E. Yes, right from the beginning.

C.S. Well, what I can remember - I dreamt that I was here and that I had been dreaming but that I had just wakened up. And that you and quite a few other people had come into the room and wakened me. . . . and I said that I had been dreaming about being to the dentist.

E. Yes.

C.S. When the noise of the - the swishing noise - went off, it sounded like a drill or something.

E. Yes.

C.S. Oh yes, I was frightened. I just remembered that of the people who were there, I recognised a Maths. demonstrator, and I didn't know any of the other people. My mother was there. She wasn't there when I was wakened up. I had seen her earlier, I think, before I had dreamed about the dentist.

E. Yes.

C.S. And of the people who were there when I was wakened up, I recognised the Maths. demonstrator and I think there were two other women and yourself, and, I think, a younger man.

E. Mmmmmmmhm.

C.S. About my mother - she has been away from home for four months, well, she has been away for four months staying with relatives because she hasn't been well.

E. Yes.

C.S. And she was a bit upset and said that she was going home and. . . oh yes, she was rather annoyed with me, she was bad-tempered with me. . . . and I can't remember why specifically. She said she was coming home because she was fed up with things down there, that her uncle had annoyed her by talking to people at the bar and his coffee was getting cold, and one of the dogs had taken a long time. I think hadn't done something she wanted - I don't know what - but I can't remember anything else. It seemed a very, very short dream.

E. Uhha. And this wakening?

C.S. Oh yes, I have remembered something else - yes, I remember wakening up. I thought I heard a woman's voice outside where I was, saying in a blurred voice what sounded like 'Nurse Maid' twice, and I can remember someone with breakfast because it was morning when I wakened in the dream.

E. I see.

C.S. Perhaps it was in the dream that I heard this.

E. Mmmmmmmhm. You are not sure?

C.S. No - but I definitely saw this breakfast. And the shape of the room was different, and when I wakened I was taken into another room and then shown the long tape with written things on it, and there were a lot of them, and said that I had been tossing and turning. . . . oh yes. . yes, you were dressed in a top hat, morning suit, and you were smoking a cigar.

E. Uhha.

C.S. And someone handed me a cigarette - I think it was my Maths. demonstrator - handed me a cigarette which had been lit at the tipped end and at the other end. I smoked it but I wasn't burned or anything.

E. You smoked it? How did you smoke it?

C.S. At the tipped end. Normally. . . . it was all sort of frayed and burnt. I don't know whether it was still burning at the end that I smoked it.

E. I see. You sucked it on the burnt end?

C.S. Yes, and I remember I inhaled - and I don't normally inhale.

E. You do smoke then?

C.S. Well, very occasionally, not very seriously.

E. Mmmmmhmm.

C.S. Oh yes, as I was smoking it. . . . there was an Indian woman with glasses in the dream - I can't remember why. I am remembering little bits as I remember other things.

E. Yes. This happens.

C.S. I don't know of anything else (long pause). . . .

E. So, if you could just do the order. . you know, the way

things happened, in sequence, if you can. You might not be able to do this, but if you can. . .

C.S. Yes. I think it was talking to my mother first. Then having the dream. Then being wakened, or waking (I'm not very sure about that). Then going into the room and seeing all the people and seeing the squiggles on the piece of paper - I'm not sure what it's called.

E. You say 'being wakened'. This was being wakened in the dream?

C.S. Yes.

E. Uhha. You don't remember who wakened you in the dream?

C.S. No. I just remember being wakened in the dream and being congratulated that I had gone to sleep. And then you with the cigar, top hat, handing cigarettes. And then the voice outside saying "Nurse Maid". And that's all.

SECOND NIGHT.

3.09 a.m. Onset of REM period.
3.13 a.m. C stage. (No REMs)
3.20 a.m. B stage with REMs.
3.28 a.m. MICHAEL 7 times.
3.30 a.m. Awakened by high frequency tone.

Transcription No. 17.

E. Have you been dreaming?

C.S. I think so. . . . I can't remember.

E. Just sit there and think - or lie and think!

C.S. I remember the very last thing before I wakened up. I had been going to stow away in an aeroplane and someone had found out and 'phoned the B.O.A.C. about it, so I couldn't . . . Oh yes, I dreamed I was reading someone else's diary, to see if there was something about me in it. It was a very big diary and. . . . in the same room as the diary I met three people, actually whom I'd met when I was up north in the spring. . . . and I think as I saw them. . . I looked out of the window, and in the sky I could see an island with a reef round it.

E. Reef?

C.S. Yes. I dreamed, I think at the beginning of the dream again, that I hadn't been dreaming and that this was unsatisfactory.

E. Uhha.

C.S. oh dear

E. It's all right. You are doing fine.

C.S. I didn't recognise any of the rooms that I was in. I recognised the notebooks - actually they looked like some of my own notebooks.

E. Notebooks?

C.S. Yes.

E. You say, the diary.

C.S. Oh, there were notebooks as well. The diary was a black book, and there were some notebooks which I was flipping through, and yes, just like my lecture notebooks. Only they weren't, they weren't green.

E. How many were there?

C.S. Three.

E. Three.

C.S. And actually, at the moment, the lecture books that I have These three people that I met - I can remember now actually only one of them was a girl who was on holiday with me. The other one was a man who she said was her father. I never met her father. And I don't know who the other one was but there was someone else.

E. Male or female?

C.S. . . . I don't know. No, I just remember there was someone else there.

E. She spoke, did she, in the dream?

C.S. Yes. . I think she asked. . . oh yes, I remember, I was trying to climb over a very, very, very high fence - and I couldn't. I got stuck halfway and I had to come down. And I was in the country at this point although I was still in the room, and then I turned round and then saw these three people.

E. Mmmhmm.

C.S. And after that, yes, I was trying to stow away in an aeroplane and someone - a man - found out and actually, I don't know how, but he thought that I had already gone to stow away in the aeroplane, and he 'phoned, took up the 'phone to 'phone B.O.A.C. and I came out of the room and said, "It's all right, I haven't gone".

E. Mmmhmm.

C.S. And I think I wakened up there.

E. Or rather, you were woken up.

C.S. Yes. I wakened anyway.

E. What was I going to say?. . . you didn't - did he say anything?

C.S. I don't think he said anything to me.

E. You didn't say - did the girl say anything to you?

C.S. Yes. I think she asked how I was getting on as I hadn't seen her for such a long time.

E. You met on holiday?

C.S. Yes.

E. She was the only one you met?

C.S. . . . the only one of the three that I had met. . do you mean?

E. She was the only one of those three that you had met on holiday?

C.S. Yes.

E. What was her name?

C.S. Christine, I think. . yes. . . . I haven't seen her since. Oh yes, I've just remembered the connection. When I was on holiday in the spring, I was pony trekking, and I told her, in the dream, that I was going riding on Sunday, and I told her that I looked up into the sky and saw an island. Well, the sky was queer. When I looked into the sky, I saw that it was square, and there was sky right round the outside, and then there was a circle of rocks - no, sorry - there was sea right round the outside and a circle of rocks, and sky in the middle.

E. Mmmhmm.

C.S. everything was transparent. . . .

E. That's fine. Anything else?

C.S. I'm trying to think. . . I can't remember. . . . there are details like one big armchair in the room and lots of shelves. I was in the room when I was talking to these three people and yet I was outside at the same time, trying to climb the

fence, but the girl and her father were on this side. . . .

I don't know.

E. Well, that's fine. You've shown very great detailed recall.

C.S. Oh, just a minute, I've just remembered another bit. I remember this - I don't know how but I spilled face powder over the diary that I was reading and the textbooks, and I remember looking round for something to wipe it up with. I found a lump of cotton wool and I could smell the smell of face powder in the dream.

E. Mmmmmhmm.

C.S. And I did get it all off.

E. Do you know whose the diary was?

C.S. No.

E. Do you know anything that was written in it?

C.S. No. I think in fact. . . oh yes, there was something written in it but it wasn't about anyone, and yet I knew - no names were mentioned - and yet I knew that it was about me.

E. Uhha. So you don't know what it was?

C.S. No.

THIRD NIGHT.

5.54 a.m. Onset of REM period.

6.00 a.m. PETER 11 times.

Awakened by the final stimulus.

6.02 a.m. High frequency tone.

Transcription No. 18.

E. Have you just been dreaming?

C.S. Oh. . .

E. You just woke up?

C.S. Yes, I was dreaming but I can't remember at the moment. Oh yes, shall I start at the back - at the end of the dream and go backwards?

E. Yes, that might be a good thing.

C.S. I shall probably remember more. Well, the second last bit. I was visiting a friend of my mother to get some money from her, some money that I think she had borrowed from us. And she was terribly kind and "Do come in and sit down", but she kept off the subject of money. And I asked her, and she said that she had some bills to pay and she showed me them, and I said, "Oh, that's quite all right", and left. And then I was walking along the High Street at St. Albans - I don't know why. . . . I can't remember. . . . (very long pause). . . . I can't remember what happened. . . . there's nothing coming.

E. Well, that's all right. The last bit anyway, you can't remember anything more about that?

C.S. No.

E. This friend of your mother's - it was an elderly woman?

C.S. Yes, she is. It's rather funny because it was a friend of my mother's, only in the house of another friend. . . and I think somewhere in the dream I was there before, but I can't remember.

E. Hmmm. And she asked you something about bills?

C.S. Well, she said she had some.

E. Can you remember the words she used?

C.S. She said, "We've had rather a lot to pay out recently, notably three bills to the same firm", and I

can't remember the name -

E. Of the firm?

C.S. No.

E. Can you remember what sort of firm it was?

C.S. No, not at all And she went across to a notice board which was on a side of the room and there was a long list of names, with ticks against it - correspondence that had been answered. And there were three ticks on these names.

E. On each name?

C.S. Yes, there were three at the name of the firm to whom she had paid the bills.

E. I see.

C.S. It was something like 'potato' or 'Portobello' - I can't remember.

E. . . . What? The firm?

C.S. Yes.

E. That's what you think it was?

C.S. Yes. My mind is just a blank but I am sure there was something before.

E. What was the last thing that you said - that you yourself said?

C.S. I honestly don't know.

E. What exactly was the last thing that happened?

C.S. I was walking along the High Street at St. Albans and a bus went past. That's what I remember last, I think.

E. Uhha. That happened after all this?

C.S. Yes.

E. Fine. Anything else?

C.S. No.

E. Was it in colour?

C.S. . . . there's nothing that I remember being in colour, but I don't know.

E. Mmmhmm.

C.S. My other dreams have been - I don't mean tonight, I mean other nights. I don't know about this.

E. These ticks - were they in ink or. . . ?

C.S. Very faint pencil.

E. In pencil? Mmmhmm. Did you see anything else on this notice?

C.S. Just lots of other names.

E. You can't remember any?

C.S. No.

E. How many would you say?

C.S. Oh, a lot - about a hundred, I should think.

E. About a hundred?

C.S. Yes.

E. Written in a line down, were they?

C.S. Yes, three columns.

E. Three columns?

C.S. Yes. And most of them had ticks.

E. There were three ticks actually?

C.S. Yes.

E. Fine.

FOURTH NIGHT.

2.53 a.m. Onset of REM period.

3.01 a.m. NORMAN 9 times.

3.03 a.m. Awakened by high frequency tone.

Transcription No. 19.

E. Have you been dreaming?

C.S. Yes. . . I can't remember. . . at the moment. . . .

E. Just lie and think.

C.S. I can remember vaguely. . . . I can't quite think what it was about. . . . something to do with Eva sleeping . . . yes, something to do with her hair.

E. Her hair?

C.S. . . . and quite a lot of conversation. . I can't quite remember what. I have a feeling there was an awful lot I just can't remember.

E. Mmmhmm.

C.S. Can I think for a little while?

E. Yes. . . yes.

C.S. (very long pause) The whole point of the dream, as I remember it, was something to do with how people looked either when they were asleep or when they wakened up. And all the people - actually some of my friends at the University whom I had lunch with yesterday . . . we were all together and we were talking in a Lancashire dialect and we were doing this during the dream. And there was some key by which we established whether a person was looking nice or not in the dream - and I can't remember what it was.

E. Whether this person was - ?

C.S. Was looking - was looking nice.

E. Oh, I see.

C.S. I can't remember what. I know that somewhere during the dream I dreamt about hills and a river but I can't remember - before all this. . . .

E. Mmmmmhmm.

C.S. . . . but I can't remember where. . . . I remember a very, very big old-fashioned wardrobe, with a big mirror in front. I don't think I was looking in the mirror. I just remember seeing the wardrobe.

E. Mmmmmhmm. Where was this?

C.S. In the room where we were sleeping. I think actually there were two rooms I have a feeling that. (inaudible). (very long pause). .

E. These things that you were saying to each other, were they. . you were saying them in Yorkshire dialect?

C.S. Yes. . well, Lancashire. . . yes. I can't remember.

E. While you were asleep, was this, or one person was asleep, or - ?

C.S. No, we were all awake.

E. You were all awake?

C.S. Yes.

E. I see. And you were talking, you were saying that this wasn't related to whether people were looking nice?

C.S. Yes, I think so. Yes, we were talking about - I think that's what it was. What makes me think that was, the last thing I remember was someone saying, "She's a l-o-o-vely girl".

E. She's what?

C.S. "She's a loovely girl".

E. A loovely girl?

C.S. Yes. About one of the girls.

E. Pardon?

C.S. About one of the girls.

E. Mmm. How many people were there now, altogether?

C.S. About six.

E. Mmmhmm. And male and female?

C.S. About four. . . . I can't remember anyone male, and yet I feel there was.

E. Mmmhmm. Can you remember anything else anybody said?

C.S. No.

E. Or you said?

C.S. No - not at the moment. I know - we were talking about some specific characteristic, but I can't remember what. (very long pause)

E. Where - you didn't know where these rooms were?

C.S. No, but they were - I remember the beds were like a school dormitory. The beds had iron frames - school dormitory beds. . . and the room was lit with just a naked bulb, with no lamp-shade, just a bulb. So horrible. It was very dingy and dull. . . and brown linoleum on the floor.

E. It was in colour then?

C.S. Yes. . . . yes, it was. . . .

E. I wasn't in the dream?

C.S. No. . . no. . . I am trying to remember what it was we were talking about. (very long pause) but I can't.

E. Don't worry. That's fine. . . You've done very well. This bit before, you were saying you were outside somewhere?

C.S. Yes.

E. You don't know where the place was?

C.S. No. I seem to remember very, very vaguely walking down the hillside and along this avenue, and there being an old sort of building, perhaps the building we went into.

E. I see.

C.S. I don't know whether there was anyone with me. I don't remember there being anyone with me. I don't know. And that was definitely in colour. A very vivid colour. Almost like the colour on a calendar. It was that sort of scenery, like a picture on a calendar.

E. Fine. Nothing else?

C.S. Not at the moment.

4.35 a.m. Onset of REM period.

4.43 a.m. LESLIE 8 times.

4.45 a.m. Awakened by high frequency tone.

Transcription No. 20.

E. You've been dreaming?

C.S. I don't think I have.

E. You've just woken up, haven't you?

C.S. Yes. . . I don't know.

E. Oh, you didn't think you were awake, then?

C.S. Yes, I was awake, but I don't know whether I was dreaming first. Was I?

E. You tell me.

C.S. I remember thinking about things.

E. You were thinking about things?

C.S. Yes.

E. Just now?

C.S. Just before I wakened up - if I did. Yes, before I wakened up.

E. What were you - ?

C.S. I don't know. I was thinking about things, thinking in a sort of rhythm. I was thinking of the same thing over and over again. I am not sure, I can't remember exactly what. . . . I'm sorry. . . It didn't feel like waking up from a dream.

E. You thought that you were thinking?

C.S. Yes.

E. Were you thinking something over and over again?

C.S. Yes. I don't think I was seeing anything. . . but I'm not sure.

E. You've no idea what it was?

C.S. No. . . sorry.

E. You've no idea what sort. . . you know, any connection. . . what form it was?

C.S. No. . . . I can't think.

E. What was the last thing you thought of, just before I wakened you? What were you thinking then?

C.S. I don't know. . . but I think if you hadn't spoken to me. . . I was thinking about. . . . I think I would have remembered something in a few moments. Do you see what I mean? (inaudible) interrupted. I don't know. . . just a blank, I'm afraid.

E. A complete blank?

C.S. Yes.

E. Just lie and still try to think.

C.S. Yes, I will.

E. Don't hurry. Just see if it will come back.

(Long pause)

A rhythm of thought?

C.S. I think a rhythm of repeating something to myself.

E. Repeating something to yourself?

C.S. Yes. A phrase of some kind.

E. A phrase?

C.S. Yes. I don't know why. Derum, derum, derum. . . . I am not sure about this even. Sometimes, before I am going to sleep, I find myself thinking or saying something inside over and over again, and it's always like that. . . . I can't think now. . .

E. You were alone? Did you think you were asleep - or you thought you were awake? Or awakening?

C.S. Awakening. When you spoke to me - yes, I did really think I had wakened up, but I think. . . I was thinking I was asleep.

E. Yes. You were asleep when you were thinking it?

C.S. half asleep. The way you feel when you are waking and drift back again, but not quite.

6.18 a.m. Onset of REM period.

6.28 a.m. PETER 14 times.

6.30 a.m. Awakened by high frequency tone.

Transcription No. 21.

E. Have you been dreaming?

C.S. Yes. . . . I remember just before I wakened up - I think - I was in a car - I was in some sort of vehicle - going over

a bridge, only. . . . oh yes. . . . only it was not happening to me, I was just watching it in a film or some sort of record at the same time. oh yes, it's just coming back to me. May I think for a minute and go right back to the beginning again?

E. Yes.

C.S. . . . Extraordinary. . . . Well, as well as I can remember, I was at home and my mother was there, and my father. . . . He was terribly angry, terribly, terribly angry, and we asked why, and he said, "Because I might get meningitis".

E. Meningitis?

C.S. Yes.

E. Mmmmmhmm.

C.S. I mean. . . 'Oh, how ridiculous!'. . . and he said, "Well, what insurance company is going to issue a licence obviously to someone who is going to get meningitis?". . . . and it kept building up, well, it was quite ridiculous, and we told him so. And he was still angry, and then he just drifted out of the picture, I don't know whether he got meningitis.

E. Sorry. I didn't catch that bit.

C.S. He just drifted out of the picture and I don't know what happened, And I was talking to my mother, and I think, I don't know, someone else. . . . and she was talking about an uncle who kept hens and charged people threepence to go and see them even though they belonged to the family. . . . and I switched on the television and there was a programme starting about a man who collected rags and bones. . . .

E. Yes.

C.S. . . . and then, instead of watching it, I was in it, and going across a bridge over a canal. And someone was saying the film was shot in Edinburgh and Glasgow - oh yes, because I recognised the road to Corstorphine. . . and we were driving somehow along the road and someone beside me was knitting a sock in a fawn wool - no, darning a sock, only all of a sudden it wasn't fawn, it was red. . . and she said, "You can buy this colour of red in any shop". . . . I think that's where I wakened up. . . yes. . . .

E. Mmmhmm. Very good.

C.S. little details.

E. All the details you can think of.

C.S. Well, when I was in the house. . . our dog was playing around. She's eight now, but she was only a puppy in it, and the table was set for supper. . . and there were three bowls of flowers on it which were never. . . there. . . .

E. Three bowls of flowers? What sort of flowers, do you know?

C.S. Flowers which looked like salad - only they weren't - it wasn't salad because they were in long silver flower vases.

E. Yes.

C.S.

E. Long silver flower vases?

C.S. Yes. This bit of the dream was in colour, but the bit where I was in the bit on television - in the film - was black and white - oh no, it wasn't. It was black and white when we were watching it on television, but the last bit was in colour because of the colour of this sock. . . . (very long pause)

E. Any other - can you remember any other things anyone said?

C.S. I am trying to remember the beginning about my father. . . .
but no. . . no, I can't. . . . (very long pause)
there is nothing more coming back. . . .

E. That's all? There seems - a quick re-cap. I'll prompt
you on one or two points. Can you just - ?

C.S. Yes. First of all, my father being very angry about not
getting life insurance. . . and my mother talking about my
uncle who kept hens and charged threepence to look at them.
And the table being set for supper, with flowers which
looked like salad. . . and switching on the television set
. . . then being with the rag and bone collector. . . and
being in the film all of a sudden, and its being in Edin-
burgh. . . and going along the road to Colinton - if it
was Colinton - only I. . . . I just knew it was called
Flowerhood Road. I'm sure about that.

E. Yes. What was the name again - sorry?

C.S. Something like Flowerhood.

E. Flowerhood?

C.S. Yes.

E. It was definitely Flowerhood, was it?

C.S. I think so. I was thinking of the implications.

E. Pardon?

C.S. I am just thinking of the implications of all this. . . And
that's all. And someone darning the sock.

E. You don't know whether it was a male or a female darning the
sock?

C.S. Female, I think.

E. And she said - what did she say to you?

C.S. She said, "You can buy this colour of red wool".

E. You can what?

C.S. "You can buy this colour of red wool in any shop".

E. Yes. And that's all?

C.S. Yes. There was a man driving this vehicle, but someone. . I don't know. . . no. . . . because we were in the back, this person who was darning a sock. . . yes. . . but no, I don't know who it was.

E. You don't know who was driving?

C.S. No.

E. No. When your father was putting his hens on view, did he say anything?

C.S. No - would you say that again?

E. Your father was exhibiting his hens -

C.S. Was he?

E. You said hens, didn't you?

C.S. I don't know - I don't think so.

E. At the very beginning. Sorry, have I misheard you?

C.S. It was just that he was angry.

E. Oh, sorry. It wasn't he. Your grandfather, was it?

C.S. No. oh, hens! An uncle was showing people hens.

E. Oh, your uncle. That's right. Hens?

C.S. Yes.

E. Yes, that's right. Did he say anything?

C.S. No, he wasn't there. My mother was telling -

E. Your mother was telling - ?

C.S. - us about it.

E. Telling you about it? Can you remember the words she used?

C.S. She said, "He charged even us threepence every day to look at the hens".

E. I see. Anything else?

C.S. I think she said it again. Yes, more or less - practically the same words. Something about it again.

E. She repeated it?

C.S. Yes, emphasised it.

E. Mmmhmm. Which - what bit did she emphasise?

C.S. I think his charging threepence.

E. Threepence? How did she actually say that? I mean - can you imitate her?

C.S. Well. . . . "Charged even us threepence!"

E. I see. . . . Mmmhmm. Fine. . . I think that's. . . There's nothing else?

C.S. No - I can't remember. . . . no. . . . oh yes! Yes, I have. When my father was angry and talking about not getting life insurance, I was holding a knife.

E. Uhha.

C.S. . . . Y - e - s. . . .

E. And what were you doing with it?

C.S. Just holding it. I don't think I was threatening him, anyway. Yes, I think I lifted it out of the shelf - out of the drawer where the knives and forks. . . . and I think I was holding it, standing with my back to him. . . .

E. Mmmhmm. You don't know what you were going to do with it?

C.S. No. I think I may have been going to set the table, I don't know, because it's just that the table was set for supper - I hope.

E. Why were you all concerned about this?

C.S. Well. . . it is just that. . . well, with my father being terribly angry. . . . and me holding a knife. . . .

- E. What do you think that might mean, then?
- C.S. Well that I might kill him. . .
- E. Mmmhmm.
- C.S. I can't remember anything else, startling or otherwise.
- E. Good. Very good indeed.

FIFTH NIGHT.

- 3.17 a.m. Onset of REM period.
- 3.27 a.m. MICHAEL 10 times.
- 3.29 a.m. Awakened by high frequency tone.

Transcription No. 22.

- E. Have you been dreaming?
- C.S. Yes. . . I have. . . . Can I think for a little while?
- E. Yes.
- C.S. (very long pause) Well, it was just about what we were talking about last night. I was going to see a film with a friend. . . .
- E. With a friend?
- C.S. Yes.
- E. Yes.
- C.S. I don't know who. And we were walking along a long, long road. . . and there were cars on either side of it. . . and lots of leaves lying around. It was very dark. . . oh yes, and then we met you.
- E. You met who?
- C.S. You.
- E. Me?

C.S. Yes. . . . and you said you had just got back from Berlin where you had gone to see some amateur production of something, but I can't remember what. . . . then all of a sudden we were all going somewhere, only we were late, and it turned out to be an hotel, where I don't know, but I think we must have been going for dinner, and we stood outside looking in, and people, I think, were on their second course. And I think we were just wondering what to do about it when I wakened up.

E. Mmmmmhmm. So - the last thing was, you were looking into this hotel?

C.S. Yes.

E. Uhha. This friend of yours - was it a girl or a boy?

C.S. I don't know. There was just someone else there. . . . yes . . . there was someone else that I was talking to. . . .

E. That was before you met me?

C.S. Yes. And then - you were still there because we were all talking about Berlin, only Berlin was in Fife.

E. Berlin was in Fife?

C.S. Yes, because you said you had gone to Fife to see an amateur production of something.

E. Was it a play, do you think?

C.S. Yes. . . . and you said. . . . I don't know how, but it was in Berlin, and I said I had never been there, and you seemed surprised, as Edinburgh was near Berlin. I don't know whether it was East or West Berlin.

E. Can you remember any words that I, or you, or anybody said? The exact words?

C.S. (very long pause) No, not really.
Just the idea. . .

E. You can't remember anything specific?

C.S. No. I think someone said, "Everyone else has started on
their second course".

E. Those were the words they used, were they?

C.S. I think so. . . or someone said, "I think they have finished
their soup".

E. "I think they have finished their soup"?

C.S. Yes. . . yes. . . . I'm not sure, though. . .

E. Mmmhmm. You have just said there was a number of people
there. How many?

C.S. Three.

E. Just three?

C.S. Yes.

E. Mmmhmm. Good. Nothing else you can recall?

C.S. No, I don't think so.

5.06 a.m. Onset of REM period.

5.16 a.m. NORMAN 4 times.

5.18 a.m. Awakened by high frequency tone.

Transcription No. 23.

E. Have you been dreaming?

C.S. Yes. . . . I must think for a while again. . . . (very long
pause) I don't know what you are going to think
but you were in it again. . . . I think I can remember the
last bit.

E. Mmmhmm. Well, start with that.

C.S. . . . and you were. . . it's rather complicated. . . you were talking a lot about some person's point in life, and saying how difficult it is for someone to Can I just think for a minute until I think out the concept?

E. Yes.

C.S. . . . actually, it was only a lot of rubbish and I don't see how I can get any sense into it. . . . How difficult it was for someone to become someone because there were so many millstones round their necks. And someone you knew borrowed £100 for £1 to run a farm, and look what people were saying about him.

E. Mmmhmm.

C.S. . . . Then you said a whole list of things. . . I can't remember why or what. . . . something like trying to be a a tailor - just an example, but two words beginning with the same letter -

E. Trying to . . ?

C.S. Well, sort of. . . what you said, trying to be a tailor, the two words beginning with the same letter. . . and a whole list of things, but I can't think of any. . . . you just said them all. . . . I think you said something about pettiness of some people's lives. . .

E. Mmmhmm.

C.S. . . . I'm sorry, I can't remember any more. . . .

E. I'm not with you on this list of things.

C.S. Neither am I.

E. I said a list of things, did I?

C.S. Yes.

E. This thing, trying to be a tailor, is that one of the things I said?

C.S. No, you didn't. It's just an example of the sort of thing, It's like two words. Whole list of things with two words beginning with the same letter.

E. All of them with the same letter?

C.S. Not the whole list but each of the pairs of words.

E. I see. What letters - can you remember?

C.S. I can't - but I can remember thinking, "Ah ha! I bet he can't say one beginning with 'Z'". . . . but there were a lot. Just. . . . I don't think it was in alphabetical order.

E. Which letters do you remember?

C.S. Well. . . I'm sure 'T' was one of them. . . and 'A' and 'P'. . . and 'R'. (very long pause). . . . I think. . . . we were talking about the futility - no, the pettiness - of people's lives, and you were giving an example of an ordinary person's life.

E. I was giving an example of what?

C.S. Of an ordinary person's life, and various things to be done, but for some unknown reason going to a Hunt Ball, and then how they thought it wonderful at the time but it was nothing when seen from outside.

E. Mmmhmm.

C.S.

E. Those were the words I used, were they?

C.S. I don't think so, exactly.

E. Can you remember any of the exact words?

C.S. I can remember you saying your friend borrowed £100 for £1.

E. Mmmhmm. Borrowed £100 for £1?

C.S. Yes. . . . And did I say he was a farmer?

E. A farmer?

C.S. Yes. He - your friend - was a farmer.

E. Where did this take place, do you know?

C.S. (long pause) . . . I don't know. . . I was sitting on a table. . . . I think you were sitting by the fire. . . . I don't know where. . . .

E. That's all?

C.S. I think so, yes.

E. let me see. Was it in colour?

C.S. I don't remember specifically that it was in colour.

E. I forgot to ask you this the last time, actually. Can you still remember?

C.S. I can't remember whether it was, no. . . . Yes, it was. I remember seeing the colours of the cars.

E. Mmmhmm. Fine. (inaudible) What exactly was the last thing, then, you think happened in this dream? Or the last few things?

C.S. um. . .

E. either that I said, or you said? Can you remember anything you said, apart from "I can't think of one beginning with Z"?

C.S. No. I don't think I said anything. I thought it.

E. Uhha. So that the last events were . . ?

C.S. I can't remember very much. I think it was your mentioning the friend.

E. The friend?

C.S. Your friend.

E. My friend?

C.S. Yes, who borrowed £100, but I can't be certain.

E. I see. And the words I said were. . ?

C.S. You said your friend -

E. Well, can you say it in my words?

C.S. Yes - I think. "I have a friend who is a farmer and he borrowed one hundred pounds for one pound" .. (I think) .. "Look what people are saying about him", or, "Look what's happened to him", but I can't remember which.

E. Mmmhmm. Good. You can't remember any of these lists, not one?

C.S. I think they were nonsense.

E. You think the list was nonsense?

C.S. Yes. You know, words that didn't make sense, didn't go together, that's why I can't remember them, but they seemed

E. Were they words, real words?

C.S. Yes, real words.

E. Mmmhmm.

C.S. No, I don't know. . what comes before. . .

E. Well. . . . that's very good.

SUBJECT G.M.

FIRST NIGHT.

- 2.47 a.m. Onset of REM period.
2.55 a.m. GILLIAN 6 times.
2.57 a.m. Awakened by high frequency tone.

Transcription No. 24.

- E. Have you just been dreaming?
- G.M. Not significantly, no. As far as I can remember, I was progressing through makes of motor cycles.
- E. You were what?
- G.M. Progressing through makes of motor cycle - and that's about all, I think.
- E. Mmmhmm. Now, when you say you were progressing through makes of motor cycle, in what way?
- G.M. Well, they were just occurring in my mind.
- E. Occurring in your life?
- G.M. In my mind.
- E. Oh, in your mind?
- G.M. Not visually.
- E. Not visually?
- G.M. No. I thought of Alastair, and I thought of Ariel.
- E. Uhha. Any others?
- G.M. . . . No, that's the one I remember, the rest were just makes of bikes.
- E. How many different ones do you think you thought of?
- G.M. Oh, half a dozen - Royal Enfield, Vincent, B.S.A., like that.
- E. Mmmhmm. So - I mean, if you tell me every make you thought you heard. . . .

G.M. no, I can't really, it was rather vague. . . . It surprises me that you think I was dreaming. It didn't seem like that to me, you know.

E. You thought you were awake?

G.M. Yes, I did. I would have said I was awake rather than asleep.

E. You were just awake, thinking, you think?

G.M. Well, yes. I was on the verge. . . . it would be difficult for me to say. If I was dreaming, that was what I was doing.

E. But these thoughts which you had in your mind, did you sort of hear your thoughts, in a sense, or you thought your thoughts - ? You know what I mean. . . .

G.M. Yes. I heard my thoughts.

E. You heard your thoughts?

G.M. Yes. Actually, I know I am almost asleep when my thoughts arrive, and often I think, "Now, how did that arrive, it's a funny sort of thought", therefore I must be almost asleep.

E. Mmmhmm. But you would have said that you were on the verge then, and not dreaming? In fact, you have had no visual images of these bicycles at all?

G.M. No.

E. Mmmhmm. So you say you thought of, or heard your thoughts of, six of these. . . . Ariel?

G.M. Mmm.

E. Well, you tell me.

G.M. Ariel, Vincent, B.S.A., Royal Enfield, A.J.S. . . .

E. Mmmhmm. Any others?

G.M. Matchless. . . . That's about the lot, I think.

E. That's it. Mmmhmm. Fine.

7.15 a.m. Onset of REM period.

7.25 a.m. DIANA 6 times.

7.27 a.m. Awakened by high frequency tone.

Transcription No. 25.

E. Have you been dreaming?

G.M. . . . um. . . . I've been thinking over, drowsing, and thinking of the word "drowsing".

E. You've been. . . ? Sorry, could you say that again?

G.M. I've been thinking of the word "drowsing". . . and when I thought of "drowsing" I got the impression of a very wide, a sort of infinite, horizontal space, but limited vertically, if you see what I mean. As if I was the centre of a sandwich.

E. Yes.

G.M. And from there, I went to an underground station with no downward escalators.

E. No downward escalators?

G.M. No downward escalators, but upward escalators. . . . and from there. . . yes. . . I was. . . how did it..? . . yes, I was drifting - this was how I sort of put it to myself - I was drifting on a membrane, and I couldn't get through it, couldn't get down through it, and if I had been able to get down through it, I would have been properly asleep.

E. Uhha.

G.M. But I couldn't get down through it and I was just drifting inwardly.

E. Uhha.

G.M. . . . and I think that's about all I can remember.

E. So what were you - asleep or awake?

G.M. Oh, I should think I was asleep.

E. You'd say you were dreaming all this?

G.M. Yes, I mean. . . it's a bit. . wild, even for my waking thoughts. . . .

E. When you started off, you said you were thinking about drowsing?

G.M. Yes. Well, that's what led up to it.

E. Well, were you awake then or were you - ?

G.M. I was awake when I started thinking, I think.

E. You think you were awake then?

G.M. And then I dropped off.

E. Uhha. So what did you actually see visually? You saw the wide space?

G.M. Yes.

E. And then the escalators? - did you see those?

G.M. Well, it wasn't primarily the escalators, this wasn't the main. . the main point was that I understood myself to be in an underground station.

E. You understood yourself? You didn't see yourself then? You didn't see the station?

G.M. Well, now. Well, it started off as I said, as if I was in the middle of a sandwich, and a very, very wide space limited above and below - no, wait a minute. . . yes, limited above and below, and it was sort of tile, smooth, and definitely was what led me to the underground station. And part of the underground station was like one of the parts between two sets of escalators - you know, you come down an escalator, buy your ticket, and carry on down.

E. Mmmhmm.

G.M. Well, it was like this. Only there weren't any further down-escalators - I couldn't get down any further.

E. You saw some of this?

G.M. Yes.

E. Did you - was any of it in colour?

G.M. . . . No.

E. Mmmhm. And that's all?

G.M. Yes. . . . I think so.

E. Fine.

(Short break, then G.M. recalled a further dream)

E. Could you just say that again. You had another dream just shortly before this?

G.M. Yes, I had another dream. Well, it must have been just before the one - I'm not too sure of the chronological order of the last two, you know, but I had this one. I just remembered about it when I started talking about doing. . .

E. Yes.

G.M. There was a whole lot of us doing this experiment. . . and there were some people in here - I am not sure how many. There were some people in your roomthere. I think there must have been, oh, four or six people altogether doing it, and we had all been wakened up. . . now, let me think. . . oh, I remember, yes, it struck me as rather amusing. You had been occupied-rather a lot with people all dreaming at the same time, you see, and you were in a bit of a nervous state, and when we all woke up and sort of emerged from our respective rooms, you came hustling out and rushed past

towards the lavatory, you see, where I was going. And I'd just got my hand on the door handle when you asked if you could go first as it was rather urgent. So you went speeding into the bog, and I stood there out in the corridor wondering what I could do with myself, and then I realised that opposite, directly opposite where I was, was the wash-room and lavatory that you showed me. . . you know, the actual one. . . . the one that you went rushing into was on the left-hand side of the corridor. So I went into the proper one, so to speak. Now, there was a bath in there. And I turned on the hot water and the cold water, and realised then that I had forgotten. . . wait a minute. . . yes, it was my tooth brush and my tooth paste that I had forgotten. So I left the hot water and the cold water on and came back to get my tooth brush and my tooth paste. . . and that's all I can remember. . . .

E. So then you think that led on to the drowsy dream?

G.M. Now, wait a minute. I'm not too sure. . . I think. . . I think. . . this was after the drowsy. I think this was almost immediately before you woke me up.

E. All this happened immediately before?

G.M. I think so, yes.

E. The whole sequence?

G.M. Well, certainly this one is a very late, late on one. I mean, it's not one that I remember from earlier on.

E. Uhha. Did you think. . . you think this, you know, the drowsy stuff and underground station came before this?

G.M. Yes, I think so.

E. Mmmmmhmm. But how certain would you be?

G.M. Oh, I'm pretty certain that the drowsy one came before that.

E. Mmmhmm.

G.M. I don't know how long before, though. . . .

E. Mmmhmm. Anything else that you remember?

G.M. No, I think that's the lot.

E. Did all that take place in colour? Can you remember any colour in it?

G.M. . . . Colour? No, I don't think so. . . I couldn't definitely say that it did.

E. Mmmhmm. Very good.

SECOND NIGHT.

3.14 a.m. Onset of REM period.

3.24 a.m. SHIRLEY 6 times.

3.26 a.m. Awakened by high frequency tone.

Transcription No. 26.

E. Have you just been dreaming?

G.M. . . . I'm just trying to think. . . I don't think I was having any coherent dream.

E. Mmmhmm. Were you having an incoherent dream?

G.M. . . . Well, . . possibly I was but I can't remember it. I remember. . . something to do with my cousin. . . . it was my cousin Ann. . . . I can't remember anything. . . I don't think it could have been anything very coherent or I would probably have remembered it.

E. Well. . . I mean. . . are there no bits. . ?

G.M. . . . I'm afraid not! . . . that was the last one certainly. .

. . . (very long pause). . . . no, barren, I'm afraid.

E. Nothing at all? What makes you think it was your cousin Ann?

G.M. Well, the last sort of thought I had before you woke me up was of a cousin, and it was my cousin Ann, I just knew it was. . . But I can't, I just can't remember what connection it was.

E. This was a dream thought?

G.M. Yes. Maybe it was the beginning of a dream, I don't know. Possibly it would have developed if I hadn't wakened up. It's difficult to say.

E. But that's all you can remember?

G.M. I'm afraid so. If I remember any more, I'll tell you after.

E. Well, I wouldn't bother. If you lie awake and try to think of it, you won't get to sleep, you know. You can think of it for a minute and then forget about it.

G.M. Yes. Sometimes it just suddenly pops up.

5.10 a.m. Onset of REM period.

5.18 a.m. ROSEMARY 11 times (short bursts of alpha rhythm following stimuli on 3 occasions).

5.21 a.m. Awakened by high frequency tone.

Transcription No. 27.

E. Have you just been dreaming?

G.M. . . . (very long pause). I can remember - I think possibly this is - this connects up with the first time, you know, when I couldn't remember - I can remember myself sitting

on the bed thing in your room there beside your brief case, and you were round in the usual place controlling all the machinery - and you were holding . . . the piece of paper that you took notes on originally, you know. . . and. . .

E. Yes.

G.M. . . I'm still asleep - this is a sort of objective view of the whole thing - I'm still asleep through here and you are reading through into the microphone various words from the notes in an attempt to induce dreams, you see.

E. Uhha.

G.M. . . . and I think one of the words. . well, some of the words were names of girls, and I think one of the words was 'cousin'.

E. Cousin?

G.M. Yes. I think that's where I got the first cousin. . . well. . . wait a minute. . . I don't know which follows from which . . . (long pause) . . . I'm not sure whether this came before cousin or after cousin.

E. Mmmhmm. You mean - ?

G.M. Well, when I thought of cousin and I couldn't remember what else was connected with it, I'm not sure whether or not this business preceded that thought or came after it.

E. Oh, I see. You've had a thought of cousin again? In this dream, I mean.

G.M. Yes. . . well, that was one of the words you read.

E. Oh, I see. Can you remember the other words?

G.M. Oh, you read out Gillian. . . and what else now ? . . Lou was another one.

E. Lou?

G.M. Yes. It was the same sort of list that you read out when you were testing the GSR.

E. Mmmmmmm. I mean - you sort of described - what did you actually see in your dream?

G.M. Oh, I saw your room.

E. You saw my room? You didn't see yourself?

G.M. No, I didn't see myself, but I knew that I was sitting beside your brief case on that bed.

E. Mmmmmmm. That you were sitting - ?

G.M. Yes.

E. In this room?

G.M. Yes.

E. I see. I see. And the word which struck you was cousin?

G.M. Yes.

E. . . . I mean, you said. . . try and think of how many names you could think of, say. You say cousin, Gillian. . . any others you can remember? I mean, distinctly in the dream? You might confuse them with the ones -

G.M. Yes

E. - I did actually read.

G.M. Well, I can't remember the exact words, but what you were reading was - I think most of them, the ones that mattered, were names of girls, you see. You were reading out names of various girls and you were noting the response. I was still asleep, you see. And you were noting the response which came through on the machinery to various names read through - coming out through the loud speaker.

E. Yes.

G.M. . . . Oh, and there was a response, of course. The names

that I recognised, you see, produced a movement of the needles and the other ones didn't.

E. Mmmhmm. . . . You say. . . the loud speaker was in this room, was it?

G.M. No, the loud speaker was through here.

E. I see. But you were in this room?

G.M. Yes, well, I was in both rooms actually.

E. I see.

G.M. I'm sort of observing the thing from the view-point of an outside observer. I'm seeing it through someone else's eyes.

E. Yes. . . but in the dream, you were looking at it through somebody else's eyes?

G.M. Yes, that's right.

E. I see. And you were in both rooms at once or on separate occasions?

G.M. Oh, at once.

E. You said there were two of you.

G.M. Yes. . yes. . . I suppose there were - either that or my body was through here and my astral plane was with you, I don't know.

E. I see. Good. Was it in colour?

G.M. I couldn't say. I don't think so. I didn't notice. If it was in colour, I didn't notice. It didn't strike me as being in colour.

E. Mmmhmm. Fine. I think that's all. The only. . well, the only name which stuck out, which you can remember in effect, is thinking of 'cousin'?

G.M. And Gillian. I remember that.

E. And Gillian. You can't remember any others?

- G.M. No. . . well, I mean, I could quote a whole string of girls' names but, I mean, they probably wouldn't be the ones I remember from the dream, if you understand me.
- E. Well, quote them and let's see.
- G.M. Sheila, Eileen, Deirdre, Yvonne -
- E. Uhha, yes. I think you are probably remembering the ones I -
- G.M. Oh yes, undoubtedly. It would be difficult to quote a list without using the ones that you used.
- E. Yes. You are certain that the other two - Gillian and cousin - you dreamt?
- G.M. Yes.
- E. There's nothing else that you can remember?
- G.M. No. . . . I don't think so.
- E. How long would you say this lasted, this dream?
- G.M. Oh. . . well, I haven't a clue, really.
- E. I mean, in your time, dream time?
- G.M. Oh, in dream time?
- E. Well, you know, that you felt it to last in your dream?
- G.M. Oh. . . . about ten minutes or so.
- E. Ten minutes? Fine.

6.47 a.m. Onset of REM period.

6.56 a.m. SHIRLEY 7 times (alpha rhythm following stimulus on one occasion).

6.59 a.m. Awakened by high frequency tone.

Transcription No. 28.

E. Have you been dreaming?

G.M. (long pause) . . . oh, yes. . . . I was looking

at a small child, aged about. . . oh, 4 or 5, and. . . who was just beginning to take a sort of objective interest in the outside world.

E. Yes.

G.M. And whose libido was just beginning to turn out. And this libido was in the form of a . . . this links up with something I said earlier on - a sort of aura, you know, a sort of little white cloud, like the believers in the occult think that the astral body looks like. . . when a person goes to sleep, according to the believers in the occult, their astral body, their astral plane leaves the body in the form of this little white cloud. . . well, this is what they think it looks like, and when they wake up it goes back in again, you see.

E. Yes.

G.M. Well, this is what I thought the libido looked like, and the child was extending it, you see, to encompass other things apart from himself. . . and, now what? . . yes. . . he extended a sort of finger to another person, a man - I don't know what the person was or what the relations had been - and got the end of his libido chopped off . . and the man rebuffed him, you see.

E. Sorry. The man. . . rebuffed, did you say?

G.M. Yes.

E. Mmmhmm.

G.M. So. . . the next bit comes from part of my lecture notes on personality. It's . . . a quotation, I think this is what Freud said. . . "His libido streamed back into - "

E. His libido what ?

G.M. - streamed back into himself, you know. . . and he became

. . . well. . . what Jung would call an introvert. . . his libido became narcissistic, you know. . . and then, of course, I saw a flower, you see, a narcissus. . . and I can't quite remember whether the child turned into a flower or whether his libido turned into a flower. . . anyway, this was to represent the narcissistic libido. . . and that was about all, I think. . . .

E. Uhha. . . The child was how old?

G.M. . . . oh, I reckon somewhere around 5 . . . yes, he must have been about that.

E. Mmmhmm. You saw this libido as a puffy cloud?

G.M. Not a puffy cloud. Like a cloud of cigarette smoke, you know, a sort of black cloud, not like cotton wool.

E. I see. Can you remember, were you talking to him, or was he talking to you, or - ?

G.M. No. . . no. . . I don't think so.

E. Uhha. And all these thoughts you had about. . . I mean, they were thoughts about - sort of Freudian, streaming back, you said, I think, his libido -

G.M. Well, yes. I saw this happening and -

E. You saw it happening? What did it look like? I mean, you say there was another person and he had his libido chopped off -

G.M. Yes, well, it was rather. . . it wasn't completely representational, you know, it was rather, just a wee bit abstract. . .

E. Uhha.

G.M. And well. . . he extended this little white cloud, you see, towards the other person, sort of sign of interest, and the

other person wasn't interested and rebuffed him, as I said, and his libido turned round and streamed back into him.

E. How did you know the other person rebuffed him, then?

G.M. Well, from the. . . well, it just followed. . . I don't know.

E. Uhha. . . Was the other person - do you know the sex of the other person?

G.M. It was a man.

E. It was a man? Mmmhmm. Was there no conversation at all then, in the dream?

G.M. Not that I can remember, no.

E. The little boy didn't even have a name?

G.M. No, I don't think so.

E. Mmmhmm. Was it in colour?

G.M. No.

E. What was the last thing that you remember, the last visual thing or the last thoughts?

G.M. (long pause) two thoughts I had very, very recently, must have been just before I woke up. I was having an argument with somebody about religion, or more specifically, about the form of religion, about church. . . . I can't remember how the argument went, but. . . it ended up. . . it wasn't a very long. . . you know. . . I had the impression that, well, that I was disagreeing with somebody about the church, and I said that I was going to re-write all the songs - re-write all the hymns, songs was the word I used - going to re-write all the songs. . . . It's difficult to get anything to expand this thing. This is all I can remember, saying that I was going to re-write all the songs. And what

that meant was that I was going to re-write the hymns. I remember why, it was because young people see no attraction in the hymns as they are and there is no life in them, nothing you can understand, nothing to draw them into the church.

E. Mmmhmm.

G.M. . . . and then after that. . . I saw. . . well, it's not so much that I saw. I just conceived of, if you see what I mean, two sailors going into a leather shop in the High Street, and they took a wallet and walked out without paying for it - well, they didn't - at least, they refused to pay for it. And that was all. It was a funny thing, that - rather odd. And the leather shop was below the Tron Kirk on the right-hand side as you go down.

E. Below where?

G.M. The Tron. Well, you know the junction of The Bridges and High Street?

E. Yes.

G.M. Well, just below that, on the right-hand side as you go down. Actually, the only leather shop's on the left-hand side as you go down, but this one wasn't - it was on the right-hand side.

E. Mmmhmm. Good. This was the last thing you remember?

G.M. Yes. Those two thoughts (pause)

E. So the last thing was - the sailors going into a shop near the Tron, pinching a wallet, and going out?

G.M. Well, it wasn't so much pinching the wallet. They chose the wallet and then refused to pay for it, and walked out with it.

E. They what?

G.M. They chose the wallet and then refused to pay for it.

E. Mmmhmm. . . . And this followed all from the argument about religion?

G.M. Yes. It came immediately after.

E. Uhha. When you were arguing, you argued with somebody?

G.M. Yes.

E. You don't know who this was? Male or female?

G.M. Oh. . . I think it was a male. I mean, it didn't feel as if I was arguing with a female.

E. Mmmhmm. You can't remember where the argument took place?

G.M. No.

E. Mmmhmm. Can you remember anything that this person said - you told me roughly what you said. . . . you know?

G.M. No, I don't think - no, I can't.

E. You can't?

G.M. . . Well. . . it's as if I said this against a sort of disembodied objection. I mean, I can't remember what. . . or I don't know if this person said anything. . . . I think maybe. . . . I can't remember.

E. Mmmhmm. And this followed immediately after the image of the narcissus, the flower?

G.M. Well, I don't know about immediately after.

E. This is the next thing you remember?

G.M. Yes.

E. Was any of this last bit in colour?

G.M. . . . Well, wait a minute. The sailor one might have been in colour, because it seems to me that the wallet was brown.

E. Mmmhmm.

G.M. That's the only suggestion that any of it was in colour.

E. Fine. Nothing else that you can think of?

G.M. No, I don't think so.

THIRD NIGHT.

6.27 a.m. Onset of REM period.

6.39 a.m. DIANA 5 times.

6.41 a.m. Awakened by high frequency tone.

Transcription No. 29.

E. Have you been dreaming?

G.M. . . . ah. . . . I am not sure about that now, but I have had a couple.

E. Well, can you think just now?

G.M. Now, wait a minute. It was something to do with Elvis Presley's new record, I remember that Also, there were a group of us and we were all eating some queer dish. . . what on earth was it ? cooked by my mother, and she referred to it as rice. . in fact, it was like a whole lot of soft mushrooms in a liquid, in almost water, with rings of onions, you know . . . and this was referred to as rice. I have never eaten anything like that before, incidentally.

E. You ate it, did you?

G.M. Yes, well, we were all eating this, yes.

E. Yes?

G.M. . . . Now. . . we were drawing up a list of some kind, I can't for the life of me think what the list was. . . I

remember writing threes and nothings.

E. Threes and nothings?

G.M. Yes. . . it was almost as if we were judging records, like a sort of Juke Box Jury affair.

E. Uhha.

G.M. . . . with a whole lot of categories, and we had to write down a three or a nothing against each one.

E. Mmmhmm. Was this connected with the Elvis Presley one?

G.M. Yes. Uhha.

E. Which came first - this part or the part with the eating?

G.M. Oh, we were eating simultaneously.

E. It all happened at once?

G.M. Yes. We were listening to the record and eating.

E. Yes. Can you remember what the record was called?

G.M. Well, it's funny, but this is the record the name of which I can never remember - but it's his latest one. . I mean, it's the actual record. What was its name again. . ?
Oh, I can't remember the name of it.

E. You remembered it in your dream, did you? I mean, you heard him sing it?

G.M. Oh, I heard him sing it, yes.

E. How many times did he sing it?

G.M. Once. . . oh, now, wait a minute. . ah. . . the record that we called Elvis Presley's latest, I've just realised, it wasn't Elvis Presley's at all. It was. . . I just can't remember the name of it. . but it was probably Bobby Rydell.

E. Bobby who?

G.M. Bobby Rydell. It's a new record he's just made.

E. Uhha. Do you spell it - ?

G.M. Rydell. R-y-d-e-l-l. And it's rather in Elvis Presley's style. . . and it's another one - I'm always whistling this tune but I can never remember its name. And it's rather after the Presley style.

E. Mmmhmm. You can't remember the name, then?

G.M. No. I could find it out for you.

E. You could?

G.M. Uhha.

E. And you just heard this one record?

G.M. Yes. There was just the one.

E. Mmmhmm. You were eating food at the same time?

G.M. Yes.

E. These lists - there was no sequence of events really. You sort of described them as fragments, you know. Was there a sequence of what you did, or what happened?

G.M. Well, it was as if we were all sitting eating that dish and listening to records at the same time, you see, and as each record finished, we had to write down a three or a nothing on this list that we had. It was all happening at the same time.

E. You don't know what was written on the list?

G.M. No.

E. You don't know where this took place?

G.M. I'm. . . well, wait a minute. My mother was there, so possibly it was at home. Yes, she cooked the dish so -

E. You don't know what she called the dish, do you?

G.M. Well, she called it rice.

E. She didn't call it any other name?

G.M. No. She said something about having eaten so much rice in the last few days you'll begin to look like it.

E. I see.

G.M. It certainly wasn't rice.

E. Was it in colour?

G.M. No.

E. And you just heard this one record by Bobby - ?

G.M. Rydell. Yes, just the one.

(The following evening, he stated that the name of the song was "Go to Paradise".)

FOURTH NIGHT.

2.12 a.m. Onset of REM period.

2.20 a.m. ROSEMARY 10 times.

2.22 a.m. Awakened by high frequency tone.

Transcription No. 30.

E. Have you just been dreaming?

G.M. . . . um. (very long pause) I don't think I have.

E. You can't remember anything?

G.M. No, I'm afraid I can't. (long pause)

E. There was a word that you remember?

G.M. Yes. . . Catalan.

E. Spell it.

G.M. C-a-t-a-lon. I think it's a derivative of catalyst.

E. A derivative of catalyst?

G.M. Yes. That's the word that was sort of circulating round my brain when you woke me up, but in what connection I just can't think.

E. Mmmhmm.

G.M. No, I'm afraid that's all there is there.

E. When you say it was circulating round your brain, what do you mean? You were thinking of it, or you were dreaming about something connected with it which you've forgotten about, or - ?

G.M. er.

E. Or you were saying it?

G.M. Well, I think it was a culmination of saying it and thinking about it. I don't think that it had reached the stage of dreaming of something associated with it.

E. Uhha. So it's just a thought?

G.M. Yes, I think so.

E. Did you hear it out loud or was it just you thought it? I mean, you didn't hear it as something - ?

G.M. No, I didn't actually hear it. I heard it in the sense that I heard the way it was pronounced by myself. The sound of the word was in my thought but it wasn't pronounced by anyone else.

E. I see.

G.M. I wish I could remember why I was thinking of it.

E. Does it mean anything to you. . . . other than being a derivative of catalyst?

G.M. No. It should have some meaning. I mean, I made it up and there was some good reason for me making this word up, but I can't remember what the reason was.

E. Mmmhmm. Good.

3.20 a.m. Onset of REM period.

3.30 a.m. SHIRLEY 8 times.

3.32 a.m. Awakened by high frequency tone.

Transcription No. 31.

E. Have you just been dreaming?

G.M. Oh heck! (very long pause) How long
does it look as if I have been dreaming?

E. Well - how long do you think you have been dreaming, or have
you been dreaming?

G.M. Well, that's what makes me wonder - you know, I feel there's
something there but I just can't grasp it.

E. Well, lie and think. It might come.

G.M. I can remember a spray of grass, and that's all.
And that's all, just like the first time, exactly the same.
When I was woken up, that's what was occupying my mind. . .

E. The spray of grass?

G.M. Yes.

E. What? You saw it?

G.M. Well, just like the first time, I heard myself saying it,
so to speak - I heard the sound of the words but they weren't
spoken by anyone else. But I don't know what connection it
had.

E. You just heard - or thought - this sort of phrase?

G.M. Yes.

E. Anything associated with it?

G.M. No, that's the thing. It's just like the other one, you

know. It has some connection - there must be some connection, but either I can't remember it or I hadn't got to it.

E. Uhha. You can't remember - ? Do you think you have been dreaming, then?

G.M. I think I have, yes, because I get that feeling of just being on the point of remembering. I don't know where to start trying to remember, you know, I don't know where to start looking, because I don't know what the connection was It's even worse than trying to remember a name because I haven't got any clue at all. I don't know in what direction to start.

4.35 a.m. Onset of REM period.

4.46 a.m. GILLIAN once.

Awakened by stimulus.

Transcription No. 32.

E. Have you just been dreaming?

G.M. Oh, yes, I have - at last.

E. Uhha. You were awake just now, weren't you?

G.M. Yes. I just woke up about, oh, 15 seconds ago, when you said 'Gillian' or something.

E. Pardon?

G.M. Didn't you say 'Gillian' or something?

E. No.

G.M. Didn't you? Oh, that's another thing I dreamt . . . Well, the main dream . . . I was in the refectory in Chamber

Street. . . and now, let's see. . . there must have been a war on or something because there were a whole lot of men, of soldiers, but they were in civvy clothes, they weren't in uniform - and there were a whole lot of nuns. . . .

E. Yes?

G.M. And then there was a lot of students - and now, how did it go? I was sitting talking to somebody - I can't remember who it was - when the soldiers all had to go, they were called off to go away. Oh, I know what inspired this. There's a book in here called "Looking for Trouble". It's a story about a woman journalist before and during the last war, and she went to Madrid during the Spanish Civil War, and it's the same sort of atmosphere there, you know, with fighting on the outskirts, and every now and then an acquaintance would go off to the front and wouldn't come back, sort of thing.

E. Uhha.

G.M. Well, it's the same atmosphere in the refectory. These men were all sitting there and then suddenly they had to get up and go off to a war which was very close, you know, you got the feeling that it was very close. They all went out and climbed into a lorry and went away. And I said to the person I was with. . . . well, what it was in effect was that each one of these soldiers must know, as he gets up out of his chair and puts his jacket on and goes out, that's the last time he'll sit and drink coffee, and soon, you know. . . .

E. Mmmhmm.

G.M. And each one of them must know that they are going away to get killed. . . . and I was just wondering what the feeling

was like, and looking at how they behaved, and so on. . . .
you know. . . the sort of nervous laughter and jokes. . . .
And now, there was something else I said. . . oh yes. I said,
"Do you know that within the next hour or so each one, well,
it's a racing certainty that each one is going to be dead?"
It must have been a seige or something that was breaking
down, because you knew that they were going to their deaths,
they weren't going to be involved in a big victory.

E. Mmmhmm.

G.M. So that it was a last line of defence more than anything
else, and I said that each of them knows that they are
probably going to get killed in the next hour and I wonder
what the feeling's like. I said, "Although each one of us
sitting here apart from these soldiers might be killed in
the next hour, it's not the same feeling, there isn't the
same certainty about it", and I just wondered what it felt
like to be certain that you are going to be killed within
an hour.

E. Uhha.

G.M. Now - the nuns got up and all left as well - I think after
the soldiers had gone - and they went outside and all climbed
into a lorry. And it was one of these builder's lorries,
with a little hut on it, you know, with a seat, a bench,
round the inside of the hut. And they all climbed in and
sat down on this little bench. Now, there were too many
nuns for the lorry and there were a couple left, you see,
without a seat, and I brought out something very philosophical
indeed. . . about the two nuns who were left. I wish I
could remember what it was.

E. You said something to them?

G.M. Yes. . . . now, something about the experiences that we all have, you know, like these two nuns, when you. . . . If you go upstairs in a bus, for instance, and you think there's a seat and you go all the way up to the front of the top deck of the bus, and there isn't one, so you have got to go all the way back down again.

E. That's what you said?

G.M. I'm not sure if that was it, but this is what I was explaining to whoever I was speaking to, the way it happens to us all the time, and the way it happened to these two nuns.

E. You don't know who you were speaking to?

G.M. No, I don't know who I was speaking to. . . . There was another example I gave of the way it happens to us. I don't think I gave the one about the top deck of a bus but it was what I was setting out to say, you know. It was that sort of thing. And I know where this comes from too. This is from that show of Shelly Berman, his most embarrassing moments, you know. I think that's where that comes from. I don't think there's anything else.

E. What was this you said about Gillian? I said Gillian?

G.M. Yes. I thought, I could have sworn, just as I was on the point of waking up, or else just as I woke up, I could have sworn I heard you say something. . . and I took it to be Gillian. Oh, I know what this is from. This is from that dream I had quite a few nights ago about you sitting reading words over the loud speaker.

E. That is what I was thinking. You sound as if it wasn't part of the dream.

G.M. Oh, it wasn't part of the dream. No, it came after the dream. . . .

E. Well. . . the thing was, you say you heard this or . . ?

G.M. Yes. I mean, if I hadn't mentioned it, I would have been perfectly certain that you said it.

E. Uhha. And you think you were awake, then?

G.M. No, I don't think I was quite awake. I think I was in the process of waking up.

E. Uhha. So you think this might be. . . well, the other dream or. . . that made you think of this, or. . . ?

G.M. Well, I think it must have been. What do you mean, the dream I had a few nights ago?

E. Yes.

G.M. Yes, I think it must have been because it certainly had nothing to do with the dream I've just had.

E. It didn't seem like the start of another dream?

G.M. No, it was just an isolated sound. It was just your voice said one word, and I, as soon as I was waking up, and I think I knew I was waking up, assumed that you actually had said something, and that it had come through on the speaker. And that word, well, either it was Gillian or it sounded extremely like it.

E. Well. You think the sound came from the loud speaker?

G.M. Yes.

E. Well, I assure you I didn't.

G.M. And it didn't sound as if you had stopped everything, you know, stopped the noise and then suddenly shrieked Gillian to wake me up, or something. It sounded as if everything was still going on, only you spoke this word, quite softly,

you know, and I was lying. And then I woke up. I thought I had been right after all in that dream I had a few nights ago but that this was part of your research to see what effect reading words like this had on someone who was asleep.

E. Well.

G.M. And I thought I had caught you out, you know. I was quite tickled with myself.

E. Fine. And you really thought you were awake?

G.M. Well, I woke up immediately afterwards. I must have been waking up. I just heard this as I woke up and I thought, "He hasn't said it soon enough".

E. Well. There's nothing else you can remember?

G.M. No, I think that's about the lot.

E. Was the dream in colour?

G.M. In colour? I couldn't be sure but I don't think so.

E. Uhha.

6.10 a.m. Onset of REM period.

6.36 a.m. ROSEMARY 8 times.

6.39 a.m. Awakened by high frequency tone.

Transcription No. 33.

E. Have you been dreaming?

G.M. . . . Yes. . . I think it was a continuation of the last one because it was in the refectory again, only I think the city must have fallen -

E. The what?

G.M. The city must have fallen, the seige must have broken down, because there was a typical story-book Nazi officer, you

know, and a few soldiers sort of in charge of the place. .

. . . I can't remember the sequence of events. I think it was longer than I can remember.

E. Give me what you can remember. What do you remember last?

G.M. . . . Well, I remember the officer telling everybody that they would obey orders, etc.

E. They what?

G.M. They would all obey orders, etc. The officer told everybody in the refectory that they would all obey his orders on pain of death, etc. etc., and the soldiers were carrying arms. And then a bell went and this was their time signal for one o'clock, I think it was, and everyone got up to go out, and the officer told them all to sit down, but no one did, and the others stood and looked at him and eventually, rather than having to assert himself, he backed down and took his soldiers off, and everyone went out. And that's the last thing I remember of that.

E. Mmmhm. He made a speech, did he?

G.M. Oh, yes. He was ranting and raving, just like they do in the films. One of these small, dapper men, you know, with staring eyes and crew-cut, breeches and boots and everything. And he had about half a dozen of the usual German common soldier, you know, huge and solid and completely vacant.

E. You said - he said you would all obey orders. What else did he say?

G.M. . . . (very long pause) . . . I can't remember. I just know that he made a speech. He was shouting at everyone.

E. That is the only thing you can remember him saying?

G.M. Yes. I think I remember him saying that any disobedience of his orders would be taken as treason and would be punishable by death, you know, but that's all I remember of his speech.

E. Mmmmmhmm. Anything else you can remember?

G.M. . . . Well, at the end of the thing, when everyone got up and started to go out against his orders, and he had to back down rather than start anything, what struck me then, the conclusion I came to, the sort of moral of the whole thing, was that, well, it just showed how useless it is to try and impose, for a conqueror to impose his will on people whom he conquers. Like in an occupied country or something, for instance, the Channel Islands or France, for the occupiers to try and be over-strict with the people doesn't work, they just rebel.

E. And that is what you were thinking?

G.M. That was the sort of moral that came up at the end. That is what I was thinking. I was there as well, I wasn't just watching it.

E. And you were thinking all this?

G.M. Yes, I was thinking this at the end, when everyone got up.

E. Is there anything else that you can remember?

G.M. No, I think that's the lot.

E. Was it in colour?

G.M. I think it was. I think I remember the officer's uniform being brown. It had one of those high necks, you know, and the strip round his neck was black, and I think the rest was brown. I couldn't be just certain about that, but that's as far as I remember it.

E. Fine. You didn't hear any 'Gillians' this time?

G.M. Not this time, no. I can't understand, that was quite fantastic.

7.31 a.m. Onset of REM period.

7.42 a.m. Awakened spontaneously.

7.46 a.m. B Stage with REMs.

7.50 a.m. GILLIAN 5 times.

7.53 a.m. Awakened by high frequency tone.

Transcription No. 34.

E. Have you just been dreaming?

G.M. . . . No, I haven't been - have I been asleep?

E. Yes.

G.M. Oh. . . .

E. Why? Did you think you had been awake?

G.M. I was - I thought I was just dozing.

E. Well, what were you - if you were dozing, presumably you were thinking about something. Can you tell me what you were thinking?

G.M. Well . . . wait a minute. . . I did dream about something. . . I dreamt I was in the Union, in the Men's Union, and that it was Wednesday night, that's tonight, or rather Wednesday. Well, first of all, I dreamt about something that happened yesterday. I gave some notes to a friend of mine, Willie Robertson, and he was competing in the beer drinking competition in the Union tonight, you see, and he

wanted me to fill a spare place in the team, but I said, "No, I have to work" . . pull my finger out, sort of thing, so I dreamt that this happened first, and then I dreamt that I was in the Union tonight, on Wednesday night. . . . and I still didn't take the place in the team but I was there watching the competition. . . . (very long pause) and I met some friends of mine from the Heriot Watt. . . . in the competition, there must have been - yes, there were four teams in the competition I was watching, and they were East, West, North and South, which isn't the case in fact. It's not like that.

E. No, they are in a line normally.

G.M. Well, no, that wasn't what I meant. What I meant was, there were four separate teams competing against each other, and they were called, you know, East, West. In fact, there were about ten or twelve teams, and they had all got fantastic titles, you know, but anyway, this is how it was in the dream. . . . I watched the start of one of Willie Robertson's team's timed run, and then I went off to work.

E. Mmmhmm.

G.M. Now, what happened? Oh, yes, I realised when I went to work that I wouldn't be able to work because of the noise from the bar -

E. From the bar?

G.M. Yes, where the competition was. I realised I wouldn't be able to work with all this noise, so I joined up with the other two pals that I had met and went off somewhere, and I remember going out of the Union. . . . but I think that was all.

E. Mmmhmm.

G.M. That's about the last bit.

E. These two friends of yours, these were male?

G.M. Yes.

E. And you. . . you said there was one originally, Ian Robertson, or something?

G.M. Oh, yes, Willie Robertson. He was the one I met yesterday and he was competing in the competition and the other two weren't.

E. Oh, I see. You met them afterwards?

G.M. Yes.

E. Uhha. What were their names, do you know?

G.M. Erik Johnsen, he's a Norwegian, and Ian Millar.

E. Mmmhmm. That was all that you remember?

G.M. Yes.

E. Was it in colour?

G.M. . . . No, I don't think so. Oh, there's another thing. The bar that evening, well, this evening in the dream when I was there, was licensed to sell beer and ales, which it usually is, but it was licensed to sell vodka as well; only vodka, no other spirits, just vodka.

E. Just vodka?

G.M. Yes.

E. How do you know this?

G.M. . . . Yes, well, there was a notice up on the bar saying that the bar was licensed to sell vodka during this evening, and there was an advertisement for vodka.

E. Uhha. What was the advertisement?

G.M. I think it was Smirnoff vodka.

E. There wasn't anything else? Just vodka?

G.M. No, just vodka. No other spirits of any kind.

E. Mmmhmm. How did you know it wasn't for other spirits?

G.M. . . . Oh, well, the notice on the bar said that the bar was licensed to sell beer and ales and vodka.

E. Mmmhmm. It didn't say anything about other spirits? You inferred that?

G.M. Yes, I inferred that. . . and from what. . . well, I just got the impression that there wasn't anything else apart from vodka.

E. Did you buy anything else yourself?

G.M. I didn't buy anything anyway.

E. No, but you were thinking of it?

G.M. No, I don't think I was.

E. You know, you didn't sort of say you wanted vodka. . They only sold vodka. You didn't think of this as though you would have liked. . . . ?

G.M. No. No, I like vodka.

E. Can you remember anything else?

G.M. No, I don't think so. Oh, by the way, I remember the soldiers in the first dream I had.

E. You. . . ?

G.M. The soldiers in that first dream, who were in the refectory, not the German ones, the ones in the dream before that, the ones who went out to get killed, well, they were American Marines. That was the part that I remembered afterwards.

E. I see. They were American Marines? This is all the first dream you are remembering now?

G.M. Yes, I've just remembered it.

E. They don't come into this dream?

G.M. No, but they were American Marines although they weren't in uniform.

E. That's all?

G.M. Yes. Oh, and I thought I heard you say something as I woke up this time too. Well, not as I woke up because you woke me up rather suddenly, but. . .

E. You thought so?

G.M. Yes.

E. What did you think?

G.M. Well, I couldn't make out what it was you said. It was a little earlier on. I think I woke up when I was drowsing, you know, and I began to wake up, and I thought I heard you say something. It began with 'D', but I -

E. With 'D'?

G.M. Yes, but I couldn't make out what it was. I heard this before, as a matter of fact, on other nights, but I just thought you were maybe reading or something and you had repeated a word - you know, that was the impression I got. That's how it struck me before. It wasn't until tonight, when I thought you said 'Gillian', that I thought I realised what was going on. But I don't know why I should think that you keep on saying words.

E. I don't know if it was the initial saying them to you to get your GSRs.

G.M. It keeps on happening, you know. It doesn't strike me as being part of a dream. It always seems to happen when I am almost awake, or when I think I'm awake. And I just - no, not when I'm awake, that's wrong, when I am waking up, and I

just hear this word spoken, you know. By the time it's registered, it's passed and I haven't recognised it, you know. But I did hear it.

E. Mmmmmhmm.

G.M. It's about the same length as Gillian but it began with a 'D' - but I didn't catch the rest of them.

E. . . . Mmmmmhmm. There's nothing else?

G.M. No, I think that's all.

FIFTH NIGHT.

3.00 a.m. Onset of REM period.

3.12 a.m. SHIRLEY 6 times.

3.15 a.m. Awakened by high frequency tone.

Transcription No. 35.

E. Have you been dreaming?

G.M. . . . I think I have, yes, but I'm not sure I can remember what about. . . . It was something to do with the desert.

E. Desert?

G.M. Yes. . . . oh. . . . (very long pause). . . . oh, yes. . . it's the Spanish desert. . . .

E. Mmmmmhmm.

G.M. I think it's something to do. . . it may be either the Spanish desert or a South American desert, because just before I woke up. . . . I was thinking about either a Spanish Province or a South American state, I don't know which, being exploited. . .

E. Mmmmmhmm.

G.M. . . . by all the so-to-speak imperialist nations, probably South American, because, I mean, Spain is an imperialistic . . . or . . well, anyway, this was the theme that, under the guise of helping and aiding poorer states, in reality the larger powers were just exploiting their natural wealth, you see.

E. Mmmhmm.

G.M. . . . Now, here. . . . I had a vivid sort of a picture of the edge of a desert. It was on the edge of a sort of steppe on the desert, and a shelter had been set up, a kind of shelter, you know, just a roof supported by poles, a canvas roof, with a whole lot of Spaniards - well, natives anyway - sheltering.

E. Uhha. What from?

G.M. The sun, I think, and the dust. There was a lot of dust. Now, there's a bit - I think this was the very last thing before you woke me up, before I woke up. . . . they must have been fighting someone because. . . the people whom they were fighting . . were . . well, one of their main characteristics was narrow, upwards-slanting eyes, almost oriental, and the very last thing was that all these people, these natives, needed was to see this type of eye and they killed straight away, you know, without asking questions. That was all they needed, just to see this shape of eye.

E. Mmmhmm. And then they killed them? How did they kill them?

G.M. Oh, I don't know about that.

E. What sort of weapons were they using?

G.M. Oh, I think they were using modern weapons. I don't think there was anything terribly mediaeval about them.

E. You actually saw them fighting?

G.M. No, I don't think so. No, I didn't actually see them fighting. You just get the impression. It's like looking at a gypsy.

E. Did you hear them fighting?

G.M. No. To look at these people, I mean, it's like looking at a gypsy, as I say. You can just imagine that they are vicious fighters, and this was what struck me, you know, that all they needed was to see, just to see, or you just mention, this kind of eyes and they would sort of go berserk, you know.

E. Mmmhmm.

G.M. So these must have been people who were exploiting their country, who were -

E. Who had that shape of eye?

G.M. Yes. Uhha.

E. You can't remember the name of the state?

G.M. Oh, no. I don't think there was a name to it. Well, I mean, there wasn't a name that I could have remembered. It wasn't mentioned, but Britain came under one of the nations who were exploiting this state, you know, under the guise of international friendship.

E. Mmmhmm. . . . Good. Anything else you can remember? You were just a sort of impartial observer - you weren't involved in this?

G.M. No, I wasn't involved. . . I was in the shelter with the natives, just sort of observing.

E. Mmmhmm. How many? There was just one shelter, was there?

G.M. Yes. I was looking at it - it was constructed against this steppe in the sand, you know, as if it was against a limestone - no, not a limestone, a sandstone shelf. And the canvas sort of abutted on the shelf at one side, forming one wall, and the rest was out in the open, and this was on the left as I looked at it. Dust blowing about and it was tremendously hot. These - as a matter of fact, I mean, the Spaniards or whatever they were had slightly narrowed eyes themselves, because they were sort of well advanced in their Spanishness, and they had very high cheek-bones, you know, with the result that their eyes were slightly more narrow than the usual Western European type. So it must have been orientals that they were fighting.

E. Uhha. Very good.

G.M. I think that you just caught this one. Another ten seconds and it would have been completely gone. It took me quite a bit to get back to it.

E. Actually, I didn't wake you suddenly. (Inaudible) . Still, that's quite good. Was it in colour?

G.M. Yes, it was. I saw the colour of the sand. I mean, I knew it was that bright, bright, terribly bright gold colour, you know.

E. Good.

4.39 a.m. Onset of REM period.

4.53 a.m. DIANA 4 times.

4.57 a.m. Awakened by high frequency tone.

Transcription No. 36.

E. Have you just been dreaming?

G.M. Yes. I've been dreaming about a little, a tiny little house, perched on the side, almost on the side, of a cliff overlooking the sea. . . in . . Brighton, yes, I think it's Brighton. . . . It was built in 1600. . by - I can't remember who it was by but he was definitely queer, you know.

E. Definitely queer?

G.M. Yes. . . . (long pause). . . . There's a character in a fairy tale that corresponds with - anyway, it doesn't matter. Small and deformed, you know, and just generally queer. Anyway, he built this house in 1600. It's a small, L-shaped house, very small, with the point of the L facing inland and he used to . . now, what was it he ate again? . . I can't remember . . . I think it was some kind of seaweed or something.

E. Some kind of - ? Sorry, I didn't quite catch what you said before that.

G.M. I can't remember what it was he lived on, but I think it was some kind of seaweed, or something equally charming. Anyway, he used to rear frogs in a glass jar . . and. . . All this was terribly clear in my dream but there are just certain details that I can't remember. . . . Frogs were one of the things he used to rear.

E. You saw this, did you?

G.M. Yes. And when they were fully grown, he would take a bird - it was a swallow, yes. He used to take a swallow and jam the swallow into the frog's jar until the swallow ate the

frog. A thoroughly delightful character. . . . I think the bloke was actually got rid of, I think burnt at the stake, or something. First of all, he was thrown out of his house, the house got into such a state, you know, because of the condition of the house he had had built himself and hadn't done very well. But in the dream, it was still standing today but he had gone, of course, and he was quite a legend in the place The town's old eccentric. . . . This town was a strange sort of town. In the dream, it was Brighton, but part of it was more like South Queensferry, the part where this house was, was very like South Queensferry, only higher above the water, you know. The same sort of pattern of houses, a narrow town building along the shore, only it was raised up above the water on the edge of a smallish cliff . . . it was very, very long and narrow, and you could look along and see the edge of the sea from the top of this cliff, and see for over a mile away, you could see the beach part, the residential part, the holiday part of the town. . . Now this old part was where, when I arrived in Brighton from the north - and immediately offshore of this part - I don't know how on earth they did it, but the citizens of Brighton had submerged a gasworks in the sea, you see. And every man - you know how gas containers rise and fall, depending on the gas? Well, every few seconds there would be a big disturbance and the gasworks would rise majestically from the sea and then a few seconds later it would subside. It was quite interesting. This is the thing that sticks in my memory about the town . . . I think that's all I saw.

E. What was the last thing that happened? The last few things - ?

G.M. I'm not really quite sure what happened last. This dream sort of lacks continuity, you know, it hadn't got a definite sequence of events, and it's rather difficult to say what came in what order.

E. This bloke - you say he was like a character in a fairy tale. You don't know which fairy tale?

G.M. No. I was just trying to think. What was the name of that little character whom everybody had to please, otherwise he would turn them into frogs or something? I know the character but I just can't remember his name. He had a funny name.

E. I don't know.

G.M. I think it began with a 'P'. He was very small and very ugly, but people had to humour him, you know, rather like a male witch sort of thing. That's what this character was like.

E. It would be interesting to know what the name is. I wonder how one could find out. When you say he was queer, you mean queer homosexual sort of queer, do you?

G.M. Well, just a bit off.

E. How did you know that?

G.M. Well, it's not everyone who rears frogs and forces swallows to eat them, and just the general deformed character - I mean, the house he built, I had a view of the house from the seaward side, it was an extremely odd house - very small, almost miniature; you know when you see a miniature house you get that feeling, I mean, it's not like a normal miniature. When you see a miniature house, you start

imagining the sort of people that would live in it, you ~~you~~^{know}. It's not like looking at a model car or something. At least, when you see a house which is not so miniature that it's inconceivable that anybody could live in it, bigger than a doll's house. I mean, a doll's house is quite innocuous, but when you get a house much smaller in reality than a normal house but still big enough for someone to squeeze into, you start imagining the tiny, deformed sort of people who would live in it. Well, this is the kind of house, you know. The windows were all in queer places and it was a bit ramshackle.

E. And this suggested homosexuality to you, did it?

G.M. Oh, no, not homosexuality, no. Not particularly.

E. In fact, you didn't imply it in this man at all?

G.M. Oh, no. I didn't mean he was queer in that sense.

E. Oh, I see.

G.M. No. I mean, he had too little contact with anybody else to be that way inclined. I mean, even just the aspect of the house suggested that he was hunched in on himself. He was a bit of a hermit.

E. And you saw him do all those things although he was no longer there?

G.M. Yes, I did. Uhha.

E. You saw him, and then he wasn't there? Or you knew he wasn't there while you saw him? Or. . ?

G.M. Well, I think I knew he wasn't there but I saw what he used to do, and rather than being present in the year 1600 I think I was present in the year today, so to speak, since I saw what he used to do. A flash.

- E. Yes. Did he - you say. . . . oh, yes, he wasn't alive any more?
- G.M. No. Alive in mind but not in body. The atmosphere was still there, you know, it was an evil little house.
- E. Yes.
- G.M. It's funny, that. I mean, taken out of its context, taken by itself, that little house would constitute a nightmare. No, it's a strange feeling, when you start to think about it afterwards, but at the time of the dream where it was incorporated in a bigger dream in a town, and there were other things to see, it lost its evil nature. But if you had dreamt only about this little house, it would be a nightmare.
- E. Mmmhmm. Was it in colour?
- G.M. No, I don't think so - no, it wasn't. I couldn't tell the colour of the gasholder. I tried to, actually.
- E. Mmmhmm. So you don't remember the last thing?
- G.M. No. . . . no. . . . No, I'm not sure of the sequence of it.
- E. Mmmhmm.

6.05 a.m. Onset of REM period.

6.20 a.m. GILLIAN 7 times.

6.23 a.m. Awakened by high frequency tone.

Transcription No. 37.

- E. Have you been dreaming?
- G.M. A bit, I think. Just before you woke me up just now. . . I was talking to someone. . . about mothers not speaking to their sons on buses . . . and I thought this

was an extremely odd idea. . . but he thought it was bad manners for a mother to talk to her son on a bus . . . I've forgotten why we The very last thing was him running off, this fellow I was talking to, ran off and shouted, "And that's why mothers are not allowed to speak to their sons on buses", but I've forgotten why it was.

E. The last thing he said was . . ?

G.M. "And that's why mothers are not allowed to speak to their sons on buses".

E. Oh, I see.

G.M. . . . This conversation took place. . . I don't know the name of the street but do you know Goldenacre at all?

E. No.

G.M. Well, you know where Inverleith Road (that's the main road down to Goldenacre) joins Ferry Road?

E. Yes.

G.M. Well, if you turn right there, there's another turning immediately to the left. Well, it was on the corner of that turning to the left in Ferry Road where we were talking about this.

E. Do you know the name of the road normally, or have you just forgotten it?

G.M. Yes, I'm sure I know the name of it.

E. Did you know it in the dream?

G.M. Oh, no, it didn't register. I mean, I knew where I was but I didn't consciously think 'this is such-and-such a road', you know. I should know the name of it.

E. Do you know who the chap was you were talking to?

G.M. Oh, yes, it was my van boy - from my summer job where I was driving a laundry van - the van boy I had.

E. Uhha. What was his name?

G.M. Raymond.

E. Mmmhmm.

G.M. Oh, there's another thing. His mother comes from Burma -

E. Bournemouth?

G.M. Burma. B-u-r-m-a.

E. Oh, yes.

G.M. Well, possibly that's the reason why, well maybe she had different ideas about manners than my mother had because she didn't speak to her son on buses. . . . That's really about all I can remember. I can't remember how the argument went. . . .

E. Mmmhmm. You can't remember what he said or what you said at that bit?

G.M. No, I'm afraid I can't.

E. You can't remember anything before that?

G.M. There was one bit . . . I think it was the pair of us again. I think we had the bike - I was driving the bike - and we were coming up this road from the Granton area towards Ferry Road, and just as we - apparently we had been discussing this matter of mothers and sons while we were driving because, just as we reached Ferry Road, I said something about . . . oh, what was it now? . . . something or other because mothers feel that . . . their sons should cease to be such a demand on them and that society should play a greater part . . . oh, this is just as if I was remembering the high spots in the conversation. I can't remember all the details.

E. Well, I mean. . . . any bits will do.

G.M. (very long pause) . .
E. No more?
G.M. I don't think so.
E. You don't know . . . you started off on the motor bike or - ?
G.M. Yes, I think we did.
E. That was where it started?
G.M. Yes, I think so.
E. And . . . well, who was driving?
G.M. Oh, I was driving.
E. And he was - ?
G.M. He was on the back . . . and we came up to this corner, I think I parked the bike and we got off, and we were standing at the corner -
E. Oh, I see.
G.M. - talking, and when we finished talking, he ran back down the road up which we had come on the bike.
E. Mmmhmm. Was it in colour?
G.M. No.
E. Nothing else you remember?
G.M. No.

7.09 a.m. Onset of REM period.
7.20 a.m. ROSEMARY 7 times.
7.24 a.m. Awakened by high frequency tone.

Transcription No. 38.

E. Have you just been dreaming?
G.M. . . . Well, I dreamt ~~ed~~ that somebody gave me a French cigarette.

E. A French cigarette?

G.M. Yes. . . Galoises or something. I'm not too sure about the make. Anyway, it was for tourists only, and it was huge, thick thing. It was about the same length as an ordinary cigarette only much thicker. . . It was fine for the first few draws and then you found that the paper started coming off, you see, so what I did was I got a dish towel and wrapped it up in the end of the dish towel and smoked it . . . but then . . . this was at the end of a meal. We went to wash the dishes up but I couldn't use my dish towel because I had the cigarette wrapped up in it. So I unwrapped the dish towel and took the tobacco out . . . then . . . what did I do with it now? . . . I think I just put it in my pocket . . . for future reference. . . and dried the dishes with the dish towel, which was all burnt at one end, needless to say. And that's all.

E. That's all?

G.M. Mmmmm.

E. You say 'we were'. Who's 'we'?

G.M. Oh, yes. . . mmmm . . . Well, Ian Millar was the one with the French cigarettes.

E. Pardon?

G.M. Ian Millar was the one with the French cigarettes , , there were several other people there too, but I can't remember who they were . . . I think there were probably about five of us, four or five of us.

E. Ian Millar is the only one you can remember?

G.M. Yes. Someone else had Olivier cigarettes, I remember, but I wouldn't take one of those.

- E. You can't remember what he said when he gave you this? Or did he say anything?
- G.M. I don't think he said anything particular. The point was, you see, I've stopped smoking and they were all offering me cigarettes and I refused them all until Ian offered me this French thing which I couldn't resist. That's Freudian wish fulfilment! I was dying for a fag.
- E. Anything else you can remember? Was it in colour?
- G.M. No. It wasn't in colour.
- E. Do you know where it took place?
- G.M. I think it must have been in Ian's house. I mean, he acted in a sort of proprietary way.
- E. Mmmhmm. And you don't know what you had? What meal it was?
- G.M. No, I don't know what we had for the meal.

SUBJECT P.H.

FIRST NIGHT.

4.56 a.m. Onset of REM period.

5.08 a.m. RICHARD 9 times.

5.11 a.m. Awakened by high frequency tone.

Transcription No. 39.

E. Have you just been dreaming?

P.H. Yes . . . oh, dear . . . hand-shaking.

E. Sorry. What was the word?

P.H. Hand-shaking. It was like on a stage, people had been in the dream, and I can't remember much before this, were all lined up half on each side of the stage, only quite close together, shaking hands. . . oh, yes, before that there was a cafe near Glasgow, completely in my imagination but near Glasgow. There was no ash tray.

E. Mmmhmm. There was no ash tray?

P.H. No Sweden comes in a lot.

E. Pardon?

P.H. Sweden comes in a lot The characters that were in at the end were at the cafe oh, yes . . I can't remember much more than that.

E. Well, don't worry. It will probably come.

P.H. Yes. The entrance to this cafe has come into my dreams before.

E. It has? You know it's near Glasgow?

P.H. Yes.

E. But it's not a particular cafe?

P.H. No.

E. When you say there was no ash tray, you mean no ash tray where?

P.H. On the table.

E. On the table. This is a specific table, then?

P.H. Yes, there was only one table there.

E. Oh, I see. And these people in the dream were first in the cafe?

P.H. Not first. No, this was immediately before they were doing this hand-shaking.

E. Oh, I see. The people followed. Nobody else was in the cafe, then?

P.H. No, just the waitresses.

E. And you walked in, did you? Or were you just there?

P.H. I was just there.

E. You were alone?

P.H. Yes.

E. Mmmhmm. You didn't say anything - or they didn't say anything?

P.H. No. I wasn't there really.

E. Oh, you just saw it?

P.H. I was just seeing it, yes.

E. Uhha. And what was happening?

P.H. I can't remember. It was just these people talking, you know.

E. What - the waitresses?

P.H. No, sorry, the hand-shaking people. There was a youngish man, and a girl, and an older girl who was definitely Swedish.

E. Swedish?

P.H. Yes.

E. Uhha. These were - afterwards but not in the cafe? They were in the cafe, these people?

P.H. Yes, they were.

E. Oh, I see. You've just remembered them? And you don't know what they were talking about?

P.H. No.

E. Uhha. And then these same people were then on the stage, were they? Or were they different people?

P.H. No, the same people.

E. And were there some more? How many people were there on the stage?

P.H. No, there were only about . . . I think . . one, two, three, four, there must have been five people in the hand-shaking business, but they were also in the cafe, but I can't remember who they were.

E. The extra ones?

P.H. Yes.

E. And they stood in two lines - two opposite three, was it?

P.H. Yes.

E. I see. And were they saying anything while they were shaking hands?

P.H. No.

E. And you weren't actually present? You were just watching it? You took no part in anything?

P.H. That's right, yes.

E. Mmmhmm. Was it in colour?

P.H. Oh, yes. The last bit wasn't, it was in a sort of brown and white, you know, like the pictures in the "Tatler", but the rest was in colour all right, yes.

E. Mmmhmm. How did you know the girl was Swedish?

P.H. I think she didn't speak in English, but I can't remember now.

E. Mmmhmm. But she did speak, did she?

P.H. Yes. Oh, yes.

E. But you can't remember anything anybody said?

P.H. No, I'm sorry, I can't.

E. Mmmhmm. Good. You can't remember anything else? What was the last thing that happened, the last action?

P.H. It was the business of the hand-shake.

E. Just a hand-shake?

P.H. Yes.

E. Uhha. Good.

P.H. I can remember somebody - I mean, it was a really hearty hand-shake - twisting someone's arm off - but not as vicious as that.

E. It was a man shaking hands with a girl?

P.H. Yes. There was a piano outside, too. I remember that.

E. You don't know where this stage was?

P.H. No. It wasn't an obvious stage - it just struck me that it was like a stage.

E. Were you above it, or on the same level, or below it?

P.H. The same level.

E. The same level? Were you standing or sitting, do you know? Have you any idea?

P.H. No, I don't know.

7.45 a.m. Onset of REM period.
7.56 a.m. ANDREW 9 times.
7.59 a.m. Awakened by high frequency tone.

Transcription No. 40.

E. Have you just been dreaming?

P.H. . . . Yes I don't seem to remember as much as last time.

E. Well, don't worry. It will probably come back.

P.H. It was on a shore. The last bit I remember was on a shore, and there was a bit of land jutting out - there wasn't any beach around it, you know, just a sort of headland, but quite small, with holes that the sea had worn through. They were tunnels. I remember looking through the tunnels.

E. Uhha.

P.H. There was more than that. I think it's gone.

E. Well, just lie and try and think of it. It will probably come back.

P.H. (very long pause) I think it was near Dunbar.

E. Near Dunbar?

P.H. Yes oh, yes, it was an American thing. I was taking a boy - there was a lot, wasn't there?

E. Well, you tell me.

P.H. I was taking a toddler to a kind of playground-place which was at a big old house by the sea - that's how we got to the sea - and we got there and everything was closed, well, no, the actual playground that we wanted to go to, they were having a conference, so it was closed and we couldn't. And the toddler was being a bit difficult about this. . . nothing on - I mean, the toddler didn't.

E. You mean the toddler didn't have anything on?

P.H. No After we found it was closed, we went and paid our admission, which was 6d. It was definitely America before this, but presumably it was Britain after . . . And there was a man who was somehow connected with this establishment who was working for some firm, I think to deliver something to him, and he was ringing up. While we were waiting around, he was ringing up to see if they would bring it, and it meant disturbing this conference. And apparently, there was some kind of road end where they could leave it but everyone said, 'Oh, no, make them bring it up to the house here'. I am not sure what it was they were bringing though - some kind of computer or something like that.

E. Yes?

P.H. And it just slid from thinking about bringing - looking out to the shore. I remember suggesting to the toddler that we go and see if there were any boats on the sea, but he didn't want to. But maybe he did in the end and that's why we went to the shore.

E. Mmmhmm. And you saw this island?

P.H. No, it wasn't an island.

E. Well, it was like an island out to the sea, you said.

P.H. No. Headland.

E. Oh, headland. Sorry.

P.H. Headland. It was definitely part of the land, yes. It was quite small because I remember looking through it - or was it two or three of the holes that had been worn right through to the other side.

E. Mmmhmm.

P.H. And grassy on top.

E. You think there were two or three of these?

P.H. Yes. More than one, anyhow.

E. Mmmhmm. They were grassy on top?

P.H. Yes.

E. Were you with the toddler then, do you think?

P.H. I don't think so No, I don't think I was. But there wasn't much of that bit, just at that moment you woke me, so he might have appeared.

E. You don't know whose this toddler was?

P.H. No.

E. Did he have a name?

P.H. No oh, there's another bit that got in here. Yes, I think it was the toddler's family. I can't remember how we got there, but we were - it was an American kitchen definitely, only it was rather untidy. And there were other children there, and there were bottles on a shelf half-full of something that looked like bitter lemon, and the woman, the mother of the toddlers, came - these bottles were about half full and she came and filled them up with water out of a kettle, and explained that it was so hot, and the children needed a lot of drinks, that in the morning she just got lots of lemon juice and put it in these bottles and kept filling them up when they got half full, just for the children to drink. Two of the bottles were . . I don't know if you know what shape centrifuge bottles are, do you? . . . they are sort of like milk bottles only they are shaped away at the bottom a bit, on a smaller base than the middle section.

E. Yes?

P.H. Two of them were like that, and one of them was flat, quite a wide bowl, not a dish at all. And there was another one - I remembered it when I was telling you about the other one . . . I can't remember now . . . it was a different shape again . . . and there was more than that

E. How many bottles were there altogether, do you know?

P.H. Well, there were two shaped like centrifuge bottles, and then when she started filling them up, two more appeared for her to fill up, for the other two children.

E. Uhha. When you say appeared . . ?

P.H. Well, maybe the children brought them. I'm not sure. But there were just two on the shelf to start with.

E. Can you remember - you sort of explained the gist of what she said. You can't remember any words she said - specific - or that you said?

P.H. No. I just remember her saying that . . . something about 24 lemons, I'm not sure about that, that she had squeezed before

E. 24 lemons?

P.H. Yes, each morning. No, I'm sorry. I don't remember much of what she said.

E. Is there anything else that you can think of? Was it in colour?

P.H. Yes I'm trying to remember if I felt the toddler's hand when I was holding it.

E. You were holding the toddler's hand?

P.H. Yes. Well, when we were walking down to the sort of playground.

E. I see.

P.H. I don't really remember it - feeling

E. Uhha. This thing which you were trying to get, or this chap was trying to get - you don't know what it was?

P.H. . . . No. I just think it was some kind of computer, but I'm not sure what it was.

E. And you said - it had to be left somewhere, you said, at the road end?

P.H. Something like that. He wanted them to leave it somewhere that was convenient to them, but the other people said, 'No, make them bring it right up here'.

E. You don't know what they actually said, then?

P.H. No.

E. Who were the other people?

P.H. Just vague people. They didn't seem to have anything to do with the children's playground bit. The house was quite an old one, with narrow stairs, about four different staircases down to the same basement at different bits, because I remember we kept going down stairs to a different place, but it must have been on the same level. And I remember thinking that this must have been on the same level as the other place.

E. Although you kept going down?

P.H. We kept going down. And it came to somewhere else, but it was on the same level.

E. I see. Fine. Anything else striking?

P.H. No. There was something before this business of filling the bottles, but I can't remember.

E. What was the most striking part of the dream?

P.H. I don't know. Probably the small boy with no clothes on. I suppose because he went through several scenes I remember him.

E. How did you know it was in America, then?

P.H. I don't know. I don't remember them talking with American accents. I remember being convinced it was America.

SECOND NIGHT.

4.52 a.m. Onset of REM period.

4.55 a.m. C Stage (no REMs).

5.01 a.m. B Stage (with REMs).

5.10 a.m. JOHN 7 times.

5.12 a.m. Awakened ^{by} ~~with~~ high frequency tone.

Transcription No. 41.

E. Have you been dreaming?

P.H. Yes, I have (very long pause) . . . yes. I was in a - I was with somebody who was supposed to be a neighbour, but I don't think she actually is, in a car. I think it was a minicab that I was driving. She wasn't a passenger, a paying passenger, but it was just that kind of cab. And we went to a house where she was supposed to live - it actually is a house in our road - and got out, and we went up that drive, and inside - the inside wasn't like the house that actually is there but the outside was . . . and inside, a lift to go up to her floor, the kind you operate yourself, about three people big We

pressed the button of the lift and it came in a minute or two, and we got in. And it kept going up and down. I don't know why we were waiting at the bottom all the time, but we were, and the lift went up and down, just a matter of a couple of feet or so.

E. Mmmhmm.

P.H. And I think we were holding the door open - that's what it was - so that it couldn't really go right up to the next floor, though it was going up and down.

E. You were inside it?

P.H. Yes, I was inside it, and the woman I was with was getting our lunch, I think, getting some food anyhow, and I only remember the last course, which was ice cream with some kind of tablet underneath, in a glass goblet dish. And we were eating this food right there, and, well, I ate quite a lot and they said, "I didn't know you were such a big eater".

E. They . . . she . . . ?

P.H. Sorry. She said. There was actually somebody else outside the lift but I don't know who it was. . . . and after that, somebody else got into the lift with a cake . . . I mean, I think she had been buying bakeries off a van at the door, and she got in with these things, and on the cake was a crimsony-red icing, and it said, "Blue Cream" on top of it. Well, I said I hadn't seen these on the van at all and was it the ordinary van, and she said, "Yes", and then I vaguely remembered having seen it and that it was blue inside this red icing I think that's where you woke me up . . . I also think there would be something before this minicab business but I can't remember as far as that.

- E. Uhha. The last thing you actually remember, then, is this cake, is it?
- P.H. Yes.
- E. And the other person who got in - was it male or female?
- P.H. The one with the cake, you mean?
- E. Yes.
- P.H. Yes, it was female.
- E. You don't know who she was?
- P.H. No.
- E. The first person, who was a female, you say it was a neighbour?
- P.H. Yes. Well, we went to the house of the neighbour and I thought of her as this neighbour, but she wasn't the same.
- E. In fact, you didn't really -
- P.H. No, I didn't really know her. I thought, "This is Mrs. Barrett and I'm taking her to number so-and-so" -
- E. Mrs. Barrett?
- P.H. Yes, but it wasn't actually the Mrs. Barrett at all.
- E. Mmmhmm.
- P.H. But when we came, I knew her quite well.
- E. You were taking her to some number. You mean the house?
- P.H. Yes.
- E. And did you talk together at all?
- P.H. Yes.
- E. What sort of things did you say? Can you remember any words . . phrases . . . sentences?
- P.H. No, not really, except "I didn't know you were such a big eater, Pauline".
- E. Is that what she said? "I didn't know you were such a big eater, Pauline".

P.H. Yes.

E. That's all you can remember of any conversation?

P.H. Yes . . . I remember her explaining about how the lift stayed open if you held the doors open.

E. What did she say?

P.H. I don't know the actual words she said.

E. Mmmhmm. And it went up and down?

P.H. Yes, a couple of feet up and down, while we were in there and eating.

E. How many times do you think it went up and down?

P.H. . . . Oh, quite a lot . . I mean . . about a dozen or so.

E. Mmmhmm. And the person who came in with the cake, do you remember anything she said?

P.H. . . No . . I couldn't even remember . . . no, I don't remember anything at all about her. I just remember the cake and somebody brought it, you know.

E. You asked her whether she got it from the . . . ?

P.H. Yes, from the regular van.

E. That's the phrase you used, was it?

P.H. . . . Oh, I couldn't be sure of that. I think it probably was. It was that sort of butterscotch cake that you can get, just plain on the top with this icing and the name of what the flavour is. It wasn't a fancy, decorated cake, or anything like that.

E. I presume that the dream was in colour?

P.H. Yes.

E. Good. There's nothing else you can remember?

P.H. I have a feeling that the bit before all this was something to do with cars and around our neighbourhood, but I can't remember anything more.

6.42 a.m. Onset of REM period.
6.53 a.m. MIKE 13 times.
7.02 a.m. Awakened by high frequency tone.

Transcription No. 42.

E. Have you just been dreaming?

P.H. . . . Yes The last bit I remember was a television screen and it was some kind of science fiction thing - what was it now? . . . I can't remember What was actually on the screen was "Hirstes" . . . but this was across the middle, you know, where "The End" would be, but there was a little oblong cut out of the middle of the screen so that the letters were disfigured.

E. Sorry - what was the word?

P.H. It was a name. I think it was meant to be the name of the author of the programme . . H-i-r-s-t-e.

E. Oh, Hirste?

P.H. Yes.

E. I see.

P.H. . . . Oh, dear . . . the bit before that didn't have much to do with that (very long pause) . . . Tell me, did I wake up not very long ago?

E. Possibly for a couple of seconds.

P.H. Because I had the feeling that I dreamt and woken up instinctively and then gone back to sleep again. Would that be right?

E. Well, it might be. But can you tell me what you dreamt about?

P.H. I can remember what I dreamt about, I think, before I woke up, but not after I went to sleep again.

E. Uhha. What did you dream about before?

P.H. I dreamt I was walking along Princes Street with my sister and . . . somebody else . . . I think it was Catherine actually . . . and we were looking in shop windows and came to Darling's, and I was looking for a skirt to buy and we were looking at skirts in the window there and I saw one . . . but Catherine said she had seen it before and liked it, and I liked it too. . . it was at the back of the window . . . and Ruth said, "Why not just open the door at the back of the window and take it out, and try it on here?", and I said, "No, you can't do that", and she said, "Come on, do it" . . . and she started taking it off the model that was in the window and started putting it on me . . . to my great embarrassment . . . and a sales girl came up and said, "You can't do this. If you would like to try this skirt on, come into the dressing room" . . . and the next bit I remember was that before I tried it on we had to pay for it, so that it didn't matter really whether I liked it or not, we'd bought it - I'd bought it - and I was furious about it . . . And I remember Catherine saying, "You're a bit hard on her" and saying that she earned 35 bob a week less, or something like that - than I did.

E. Mmmhmm.

P.H. And I was just at the cash desk paying for it before I tried it on . . . and then, this may have been part of the dream. I think I woke up and I said to myself, "Why doesn't he wake me up because I've just dreamt?", and then presumably I went back to sleep and I had this other dream,

and I can't remember anything about it except this bit about the television screen.

E. At the end?

P.H. Yes, at the very end.

E. Mmmhmm. You both liked the skirt, did you?

P.H. Yes.

E. When you saw it in the window, this was?

P.H. Yes.

E. And you talked to each other, did you?

P.H. Yes I remember Catherine saying, "There's a perfect skirt at the other end of the window. I've seen it before but I don't want to influence you. I don't want to say anything about it" . . and we got there and I liked it too, and then she said, "Why not just try it on?" . . .

E. That's fine. Was that bit in colour?

P.H. Yes.

E. This last bit - you can't remember, you think it was a science fiction programme on the telly?

P.H. Yes, I think it was, because the thing is, Hirste is the name of our Chemistry Professor, and I thought, this is another of these, like Fred Hoyle's ones, you see, that was also written by a professor, A for Andromeda, so I remember thinking, this must be going to be a science fiction picture written by the Professor. I think that's how I knew, but I don't think we had seen any of the programme before that.

E. Mmmhmm. There was nothing else? There was this oblong, you say, cut out of the middle of the name?

P.H. Yes, so that you could still read the letters, but there was a little gap in the middle.

E. Mmmhmm. Well, I think that's all right. You can't remember anything else?

P.H. No, I can't.

THIRD NIGHT.

2.54 a.m. Onset of REM period.

3.03 a.m. ANDREW 4 times.

3.05 a.m. Awakened by stimulus.

Transcription No. 43.

E. Have you just been dreaming?

P.H. . . Yes, I have. . . . I definitely have . . . Well, I was rather muddled up with being wakened up in the middle.

E. Pardon?

P.H. I'm muddled with being wakened in the middle all the time . . . well . . . I dreamt of skiing and I dreamt about visiting people Now, the skiing bit . . . it was with the - we were never actually skiing and we were just waiting to go there, and I was going with the chap who was the sailing instructor at the course I was on in the summer who is actually a skiing instructor as well. There was somebody else in the background, and we were just - I think it was a Saturday morning and we were just waiting for something or other before we started skiing . . . I seem to remember that we did this twice, or I dreamt it twice.

E. What? Waiting for something?

P.H. Yes. We were sitting around, but outside it was . . . I can't remember much more . . about that It was on a slope we were waiting, sitting down . . . Oh, dear . . . No, I can't remember much more of that.

E. You said something about another - ?

P.H. Yes, another fragment. I was doing some kind of survey - and I don't know how this tied up with the other bit at all - if it did, I don't know - but I was doing some kind of survey, visiting people in their houses. And this was also on a Saturday morning I don't remember what for, and I don't remember going in to anybody's house. I just remember that I was doing this and I was talking to somebody official about it. And he said, did I want to go back for any reason to check on anything, did I feel that there was anything to be gained in going back and revisiting anybody. And I said, no, I didn't think so . . . There was somebody else who was doing this too, and he was asking this other person as well - I think it was a man -

E. This other person, you mean?

P.H. This other person who was doing this kind of survey, but not with me, he was just visiting people as well. And the man said, no, he didn't want to go back either I was getting paid for this, paid by the visit, and I remember thinking, if I said yes, I would get more money, but I just said no, I didn't want to go back . . . and I also remember thinking, what in the world would I do to go back . . . I was getting a bit worried because I thought perhaps there was something that I should have done to go back and see them for . . . I just felt, well, in case I had missed out something and should want to go back and check on it

E. Mmmhmm.

P.H. . . . Muddled up with this was . . . I'm quite sure I was waking up for a few seconds and then went back to sleep again . . .

E. When do you think you woke up?

P.H. Well, in between those things, and I think I dreamt about waiting for skiing more than once.

E. I see. You think the skiing came first?

P.H. Yes, I think so. And I also remember just before you woke me up - I don't know whether you can hear through there, but this "white noise", every now and again there is a sort of click as well as a whooshing noise, and twice before you woke me up - because I thought I was awake whether I was or not - it went click, and then a voice said "Andrew", and then a little later there would be another click and a voice said "Andrew" - I think it was a female voice, quite a low-pitched female voice

E. Mmmhmm.

P.H. And I also remember thinking, is this him saying this to wake me up, or what is it - but I definitely heard somebody saying this.

E. You heard this from the speaker?

P.H. As if it was from the speaker, yes. I presume it wasn't you?

E. You were awake, were you?

P.H. Well, I thought I was. I thought I was just on the edge and this thing woke me up, and then I would just go back to sleep again and this voice would say it again and push me again over the edge of being awake.

E. . . . Well, I'm not quite with you, actually. You were -
I mean, it wasn't part of the dream?

P.H. It wasn't anything to do with the dream, no. It was after
all these fragments.

E. You're positive about this?

P.H. Yes, absolutely sure.

E. Can you point out the click? I'll turn it on now.

(Click was not present on playing the "white noise"
tape, and was probably due to interference in the
electrical mains supply. A specious explanation
of her perception of "Andrew" was provided.)

E. What was the last thing you remember in the dream?

P.H. I think this official saying did I want to go back
and visit these people, and wondering why I should have to
go back. I think that's what it was.

E. You thought you had something to do, in the dream?

P.H. Yes. Some kind of psychology thing I was doing on them,
asking them questions, but I don't know what for or anything
like that I was going to have to borrow a pair of
ski pants and I was borrowing this Robin's, this instructor
chap that was there. And we set out to get a pair of his
with things in his pockets, and I remember going through the
pockets and looking at the things in the pockets. Seemed to
have all sorts of little pouches up and down the sides and
. . . I can't remember there was a jug, but I
remember asking him if there were any cigarettes in any of
his pockets and he said 'no', he didn't think so, and then I
found a packet . . . Yes, and it was fairly dark and I lit

one and it turned out that they were tipped ones and that I had lit the wrong end, the tipped end. So I put it away and I put it in a oh, I can't remember, but anyhow something piled up with stuff, and I shoved it underneath.

E. While it was still burning, or . . . ?

P.H. Yes I've forgotten. I'm afraid that's all I can remember.

E. Did this occur at the end, or . . . ?

P.H. No, this was in the middle of the skiing bit. I remember they were black and rather baggy - the trousers, not the cigarette.

E. Was this dream in colour?

P.H. Yes.

E. Yes. Anything more you can remember?

P.H. No. I have something just beyond where I can get at it . . .

E. The ski instructor's name was Robin?

P.H. Robin, yes.

6.36 a.m. Onset of REM period.

6.43 a.m. Car passed outside.

6.46 a.m. Door slammed in corridor.

6.49 a.m. Scooter passed outside.

JOHN 7 times (20 seconds after scooter had passed).

6.51 a.m. Awakened by high frequency tone.

Transcription No. 44.

E. Have you just been dreaming?

P.H. . . Yes I was with somebody . . no, the bit I can

remember, I was with some small boys and . . . we had a car, I had a car . . . and we were trying some kind of racket. I parked the car and these boys were doing something and getting money from people, but I'm not sure what they were doing. I think they were getting money - yes, they were . . . the car was parked fairly near Blackford Pond.

E. Blackford Pond?

P.H. Yes. I mean, not in the park but on the road quite near . . . they weren't boys that I knew, I mean, even in the dream, they were just a couple of kids off the street . . . I decided that this was no good so we . . . or thought we saw a policeman or something like that, so we moved on and we decided that we would go up to Marchmont and do the same stunt. And we went up to Marchmont by going, well, up Charterhall Road, which is a slope -

E. Which road?

P.H. Charterhall Road, actually. Well, it's a slope which leads up to Blackford crossroads. Do you know where it is, actually? - because there, Blackford Hill, with no houses as this point, slopes down on the right, well, up on the left as we were going, there is a big, wooden fence. Well, when we went past, there were people sitting along there, facing the sun (it does face south, actually, I know) and they were just sitting leaning against the wall sleeping or sunbathing . . . I think they were all men, actually, leaning against the fence . . . and I knew one or two of them, and I stopped to speak to one of them, who was called Ralph in the dream, but he is a boy I know called Jim, I know that, but I'm sure he was called Ralph in the dream.

E. He was called Jim in real life?

P.H. Yes I don't know what we were saying, though . . I think something about the fiddle we were doing - the boys - and this chap had come into the dream before, in another part I had before this, but I can't remember it at all so I think we were talking about the bit before . . I think it was just as I was going on that you woke me up . . . I can't remember the bit before that

E. You can't remember exactly what you were talking about?

P.H. No.

E. Who were the other people that you knew?

P.H. I don't think there was anybody that I really do know. I think they were just involved in the first part of the dream.

E. Mmmhmm. How many people to you think were leaning up against the fence?

P.H. Well . . a lot, about. . . . I don't know, about a hundred, maybe. There was quite a long stretch of fence and there seemed to be people all along they were all just sitting with their back to it . . . and there was quite a strong sun. I didn't feel it on me but they were getting it. I wasn't in the car at this point, I don't think.

E. You weren't?

P.H. No.

E. These boys - were they still with you?

P.H. I think they went on ahead. They weren't actually there when I was talking to this boy.

E. Mmmhmm. They were in the car with you, there when you drove along?

P.H. Yes, that's right.

E. The last thing, you say, is that you think you were moving on?

P.H. Yes I suppose to go on to Marchmont with the boys.

E. Mmmhmm.

P.H. This other part had something to do with the slope of the hills that they were all watching - well, facing.

E. This other part came in between . . what?

P.H. It came before this business with the car and the small boys.

E. Oh, it came before?

P.H. Yes . . oh, yes.

E. But it was still that thing they were watching, so it was still connected with that, these two bits?

P.H. Yes I think, whatever it was the small boys were doing, was done again in the first half and I thought, this has worked once and it may work again . . . but I can't remember what they were doing.

E. Well . . . it doesn't matter. Was the dream in colour?

P.H. Yes, it was. Not very vivid colour, but I can remember that they had orange-yellow faces.

E. This chap, Jim, who is he actually?

P.H. Oh, he's a boy in my chemistry year, actually. I didn't know him very well, just to chat to.

FOURTH NIGHT.

2.18 a.m. Onset of REM period.

2.30 a.m. RICHARD 13 times.

2.38 a.m. Awakened by high frequency tone.

Transcription No. 45.

E. Have you just been dreaming?

P.H. Yes, I have I don't know if I can remember. I know it ended up with a sale.

E. A what?

P.H. A sale. You know, a big shop in town having a sale.

E. Oh, yes.

P.H. (Very, very long pause) . . . I'm sorry, I don't think it's coming back.

E. Nothing at all?

P.H. I have a sort of idea, not really a very visual one, about what this sale was like . . just . . . I mean, it was a good enough picture but I don't think I could describe it now. I got the impression of wallpaper, somehow. I don't think it was on the walls, I think it was on the tables. Embossed stuff.

E. Em . . . ?

P.H. Embossed wallpaper. I don't think there were lots of people. I was looking for something to replace something which is connected with the rest of the dream. It wasn't just that I was going to the sale.

E. Mmmhmm.

P.H. No, I'm sorry, that's the only bit I can remember.

E. Mmmhmm. Can you remember where - you say the shop was in town?

- P.H. It wasn't any shop that I knew, just a very generalised sale.
It wasn't any particular shop.
- E. You wouldn't even know where it was?
- P.H. No, I don't think I recognised it.
- E. You can't really remember any proper visual picture?
- P.H. Yes, I have a picture, but it wasn't definite enough
to be able to tell you the colour of the carpet, or anything
like that.
- E. It was coloured, was it?
- E. Yes. The wallpaper impression I have was that it was
beige-coloured.
- E. You can't remember any conversation?
- P.H. No I can just feel it receding and I couldn't catch
it. I'm sorry. I know there was something before that.
You're quite right. There's quite a bit before that.
- E. That was the last bit of the dream?
- P.H. Yes.

3.45 a.m. Onset of REM period.

3.54 a.m. MIKE 10 times.

3.59 a.m. Awakened by high frequency tone.

Transcription No. 46.

- E. Have you just been dreaming?
- P.H. Yes . . . I was dreaming I was going to make an evening dress
and sew it myself, and I was discussing with my mother how
much material I would need . . . and telling her what it was
I had in mind, and I looked through a book of patterns too -

at least, I was looking through the patterns when you woke me up.

E. Uhha.

P.H. (very long pause) I can't remember whether I went to a dance before that or not

E. Doesn't matter. Don't worry.

P.H. No, it's gone.

E. I'm sorry. Can you remember any words you said in conversation, or were you just getting the general idea?

P.H. I remember saying . . "I think I can get a dress out of two and a half yards". That's what I said. "A bit ridiculous . . . two and a half yards, because I don't want it very full and the short length's fashionable". . . I remember saying that I don't remember much else, actual words.

E. Do you remember anything your mother said?

P.H. No, nothing at all. She must have said something.

E. How many patterns do you think you looked at?

P.H. Well, I had just started because I remember looking at the index . . . yes, I remember looking at the index, and it was about the third thing down that I wanted, that the evening dresses were, and I opened it up and there were maybe about half a dozen pictures of dresses on that page. I don't think I turned the page over, I was just looking at those ones - which weren't actually evening dresses, when I come to think of it.

E. What sort of dresses were they?

P.H. The one I remember was a coat, I think, but it was short and sort of pale purple colour, and there was a huge, big collar - and I don't know why, but I think it was the collar that

impressed me, which is why I remember it, that one rather than the others.. I seem to remember that none of them were evening dresses I just remember looking at that.

E. Was it in colour?

P.H. Yes . . . yes.

E. Fine.

P.H. I was outside before that, out of doors, but I can't remember what - I just have the idea that I was outside.

E. What? You had the idea you were outside?

P.H. Yes.

E. Before you started . . ?

P.H. Before this happened, yes. There was something that happened in the dream but it was outside - but I can't really remember what it was I was doing outside.

6.36 a.m. Onset of REM period.

6.50 a.m. Awakened by high frequency tone (following stimulus RICHARD).

Transcription No. 47.

E. Have you just been dreaming?

P.H. . . . Well, I thought I was awake and just thinking about whether I would go back to sleep and dream . . . wondering whether it was half-past seven yet, or anything like that.

E. You think you were awake?

P.H. I think so, yes.

E. How long had you been awake, do you think?

P.H. . . Well, you proved that I can't really tell, so I don't really know . . . not very long . . . about ten minutes, I think.

E. Well, what could you have been thinking about, then, while you have been awake?

P.H. (long pause) It can't have been as much as that, then, because I can't remember a thing about it . . .

E. You can't remember anything at all?

P.H. . . . No, I don't remember having definite, direct thoughts, just vague things like . . . feeling sleepy and not being asleep, and wondering what time it was, and that sort of thing.

E. Mmmhmm. You definitely can't remember anything at all just now?

P.H. . . . No, I thought I dreamed quite a way back now . . and I seemed to wake up and think about that a bit and go to sleep again, and wake up again just now . . .

E. Mmmhmm. Do you remember anything about the original dream?

P.H. No, not now. It seems a long time ago.

FIFTH NIGHT.

4.57 a.m. Onset of REM period.

5.03 a.m. JOHN 8 times.

5.11 a.m. Awakened by final stimulus.

Transcription No. 48.

E. Have you just woken up?

P.H. . . . Yes, I think so.

E. Have you just been dreaming?

P.H. Yes.

E. Can you remember what it was about?

P.H. Yes . . . Now . . . I dreamt a bit and then it's the same as before, when I thought I woke up and went over the dream and went back to sleep again . . . but I'm pretty sure now that I didn't really wake up.

E. Mmmhmm.

P.H. . . . I dreamt that my father owned a small two-seater Jag and that I came home one day and bought another one for some reason. He never drove this other one but he drove the new one, you know, just round the block, and came back and said how terrific it was. One of the cars was red and one was blue, but I can't remember which one it was, which was which . . . Then we skip a bit. I can't remember what came between, but I do remember that I had a turn at driving the new car as well, and there was a bit in between and I dreamt that I woke up and told you about this . . . and I remember you seemed to want to know which car was which colour . . . and I remember that there was a little hatchway in the wall just beside me here, and you were at the other end - just through one wall and not through two. I remember looking through - I think you had a beard, just a small, pointed beard. Well, me telling you was all mixed up by being at a children's art exhibition. It was in a restaurant, a place like P.T.'s or something like that, that kind of restaurant.

E. Mmmhmm.

P.H. And some friends of ours, people who live across the road, have a son who's good at painting, and he'd won Second Prize or something like that, I think, and they were there, and we were looking at these paintings, and I was telling my family

about telling you about the dream (a bit ridiculous) and I remember they were listening . . . oh, and when I was telling you about the dream, I could remember most of it and I told you a list of, well, a sort of summary of it before I started telling the details, and then when I got right down to it, I couldn't remember what the summary stood for, because I remember almonds came into it.

E. Pardon?

P.H. Almonds came into it, and I couldn't remember, when I got to the bit, what about almonds I had been dreaming.

E. Mmmhmm.

P.H. . . . I remember we were at this art exhibition for a while . . . the First Prize, I remember for some silly reason, was done by somebody aged eleven, a picture of the Eiffel Tower, and the part underneath was done in bluey-green oils . . . I can't remember much more really.

E. That's the last thing you remember, was it? Or what was the last thing?

P.H. . . . I think the last thing was this art exhibition and me being there and talking about this dream, but I can't remember what was the actual last thing that I said. I do remember, funnily enough, that while I was telling you the dream, and I could see through the hatchway, you were eating a . . . and it turned up later at this art exhibition, that it was a steak pie that my mother had heated up for you, and she asked you . . . yes . . . if it was hot enough.

E. Mmmhmm.

P.H. And you said it was, and she pointed out how difficult it was to guarantee it was hot enough. I mean, she said she had left it in the oven till the last minute.

E. Mmmhmm. That was near the end?

P.H. This happened while I was telling you about the dream.

E. The dream? That was about the Jaguars?

P.H. Yes, and there was more than that, but then I remember almonds coming in, but I couldn't even remember half-way through the dream what it was.

E. The almonds - you really thought, you can't remember dreaming about them, you remember telling about them. Is that it?

P.H. Yes, I suppose that's right, yes.

E. I was there before the art exhibition, was I, or during it, at the same time?

P.H. . . . I don't actually remember seeing you at all, just I assumed you must have been there because my mother was talking about the steak pie.

E. Uhha. This hatch which I was - ?

P.H. Oh, yes, that must have been before.

E. So really, you dreamt the dream and told it to me, and then you told it to these other people at the art exhibition, and I was also there eating the steak pie at the same time while your mother was talking about it. Is that roughly it?

P.H. Yes, I suppose so, except that you were eating the steak pie through the hatchway as I was telling you about the dream.

E. Oh, I see.

P.H. You weren't eating it at the exhibition.

E. I wasn't?

P.H. No.

E. When was your mother talking about it, then?

P.H. At the exhibition . . . because she had given it to you. I think it was you had come to our house to do this thing, to

do this experiment, so that all you had to do was to go to the oven and get it.

E. Mmmmmhmm. Good. Fine. Was it in colour?

P.H. Yes, it must have been.

E. Mmmmmhmm. You can't remember any specific phrases that you used, or I used, or your mother used? You've given what was said but you can't remember any words or phrases specifically?

P.H. I seem to remember my mother - this bit about saying, "I hope it was hot enough for you", or "I hope it was warm enough for you" . . . and actually I remember what I this hatchway that I was talking about wasn't here all the time, for some reason. I was just sort of lying with my eyes half closed and then I looked across to the wall and there it was. I think perhaps I was going to sleep again in the middle of telling you, or something like that, and I remember you saying . . something . . "Be careful, my girl" or "Watch it, look out", or something like that, and putting your arm through the hatchway on to my arm, sort of patting it to keep me awake or something.

E. Uhha.

P.H. I don't know whether I dreamt the actual words because the thing is I can't remember the phrases. I think I may have dreamed them in thoughts. I don't remember the tone of voice or anything like that.

E. But I definitely did say things?

P.H. Not much. Just a bit.

- 7.35 a.m. Onset of REM period.
7.41 a.m. ANDREW 11 times.
7.45 a.m. Awakened by high frequency tone.

Transcription No. 49.

E. Have you just been dreaming?

P.H. Yes . . . Yes, I was dreaming - the first half of the dream I can't remember contained a girl whose arm had been broken.

E. Whose arm?

P.H. Yes . . . The fact that - cut off with something because there was no arm from - above the elbow there was no arm. And she had a plaster thing - which made it . . . oh, I don't know, but there was just something sticking straight out from her shoulder - which wasn't an arm . . . She was in this dream for some reason but I can't remember what, but when I remember - the bit I remember was, she was going to hospital to get something done about it, and she and another girl were in Princes Street . . .

E. Mmmhmm.

P.H. Usually, with people with something wrong with them like that, I feel sick or something, but I didn't feel disgusted at all. I didn't feel disgusted or anything. And after they'd been to the Royal, they were going to . . . back to the school I used to go to, which is in Morningside - and I went with them, and at the school on a notice board there was a list of people's names in the form of a ladder which you could move up and down. Oh, this was very long. The first maybe eight names were just in blocks that you could move around easily, but otherwise they were all stuck on paper, and to move any of these names you had to cut the name out and stick them on another of the holes. I remember we were

all a bit put out with this because for some reason we had to change one of the names and we couldn't think how to do it without making a terrible mess. We never actually did it. As far as I remember, we just sort of stood and thought about it and then we were off to something else - we were in one of the classrooms . . . and I can't remember what we . . . what we did - there's a bit here that I can't remember - and then a whole lot of the girls - this was Saturday morning, I remember this quite distinctly, but there were lots of girls around in uniform obviously having school. So a lot of them came in and sat down . . . a lot of row . . . I'm not sure if there was something else but anyhow after a while, some of the staff came in - there was the Headmistress and . . . three others, but I can't remember who they were. I don't think they were any of the ones I knew. They sat down facing the same way as the girls were, towards the blackboard, they weren't facing themselves, and the Headmistress was talking to them and she had laryngitis. And I remember her saying in a hoarse voice that she couldn't speak to them properly and she had to speak the other way in case they caught anything. I remember thinking how bad the discipline was because after every sentence there was a great sort of chattering and noise, and one of the other members of staff would say, "Be quiet" or something like that, and the Headmistress would go on after that. I don't remember what she was actually talking about, I think you woke me just as she was talking about her laryngitis.

E. Her laryngitis?

P.H. Yes. We, as far as I know, were just standing there - we weren't part of the class or anything like that.

E. You were standing?

P.H. Yes, because I remember seeing it from that height. We didn't seem to be part of it at all, we were just watching and I don't think the two other girls were still there.

E. Mmmhmm. . . . What's the name of the school?

P.H. St. Hilary's School.

E. St. Hilary's?

P.H. Yes.

E. Can you remember any of the names on the list?

P.H. Oh, no. I don't remember really looking at them - looking at the way it was made up.

E. Mmmhmm. There were about eight which were moveable, you say?

P.H. Yes. There are - I don't know if you want all this - but the ones that were on a strip of tape that was folded like a fan, I mean folded somehow - right in on itself so that you only saw one name - well, there were two columns . . it was two names and then, if you wanted to see what the rest of the list was, you had to pull it out so that it expanded - you see what I mean? So that it hadn't to take up too much space, I suppose.

E. I see. This was a - I'm not absolutely certain - it was in the form of a fan?

P.H. Well, it was sort of folded backwards and forwards on itself and it didn't try to take up any space.

E. This was the list?

P.H. Yes, this was the list of names gummed on a piece of paper.

E. I see. Those were the ones that you couldn't move?

P.H. Yes. That's right, yes.

E. Oh, I see. But the others were separate?

P.H. Yes. They were completely separate, but they were just attached to the same piece of board so I suppose they were the same names.

E. I see.

P.H. It seemed terribly important at the time but I don't know what the list was for, or anything like that.

E. It seemed very important?

P.H. Yes, and when we got there, one of the . . . one of the girls was trying to open out this . . . this folded bit, and she was pulling at one end so that the other end was sticking, you see, and it wasn't unfolding, and I was very anxious because I thought she was going to tear it. So I told her, "Be careful", or something like that. And then she opened it out properly.

E. Did you know any of these girls?

P.H. No, I don't think so.

E. . . . The first part . . . you say there was the girl who had the accident - her arm had gone from below the elbow -

P.H. Well, she had no arm at all as I could see, she had some sort of dressing sticking out from her shoulder, and there was a glass bit - stuck on to the end, you know - instead of having a hook it was a piece of glass tube that stuck right out. Actually, it was a piece of scientific apparatus - it was a glass tube with a sort of turned-over bit at the end - a hollow tube which turned over at the end and there was a proper ground-glass joint at the end of it. Now, the laboratory where I work has got one of these set up permanently - it's used for distilling things. It's about eight inches long

and then this bit turned over at the end so that you can stick another ground-glass joint on to it and collect something.

E. Mmmhmm.

P.H. But I remember everything. It was exactly the same piece of apparatus but it was sticking out of her shoulder.

E. I see.

P.H. And then after she had been to the Royal to get it done, it wasn't quite the same, the glass was just a little bit . . . quite thin . . . still a tube though and ended in a sort of - I can't remember, really - but, yes, I remember now, the other girl was sort of holding her up and I remember thinking, "I wonder how you hold a person that has no arm", because she was at that side - she wasn't at her 'good arm' side.

E. I see.

P.H. And about half-way along Princes Street, she said . . well, I can't remember - what she must have said was, "Would you like a turn now?" - something like that. And I was holding her and I couldn't . . I couldn't really . . I just sort of . . . there was a proper arm at that point but I still thought, you know, that this might do some damage if I push it in the wrong place. But she kind of leant against me and her elbow stuck into my side - I can remember that. But then - I think it was at that point that we were all of a sudden at school.

E. I see.

P.H. It didn't go on with that.

E. Good. Was it in colour?

P.H. Yes.

E. Anything more that you can remember which might . . . ?

P.H. These two girls seemed to be dressed in green for some reason. They had green coats on.

E. Mmmhmm. I think that will do.

SUBJECT K.F.

FIRST NIGHT.

- 3.00 a.m. Onset of REM period.
- 3.01 a.m. Awakened spontaneously.
- 3.04 a.m. B Stage (with REMs).
- 3.10 a.m. SHEILA 11 times (9 seconds of alpha rhythm followed the final stimulus).
- 3.13 a.m. Awakened by high frequency tone (30 seconds after the final stimulus).

Transcription No. 50.

- E. Have you just been dreaming?
- K.F. No, I'm half-awake.
- E. You're half-awake?
- K.F. Yes.
- E. How long have you been half-awake?
- K.F. Mmm . . . oh, about ten minutes, I think.
- E. Uhha. Well, what have you been thinking about, then?
- K.F. Carpet slippers.
- E. Carpet slippers?
- K.F. Yes.
- E. Mmmhmm. Can you describe what you were thinking about, then? What were you thinking about slippers?
- K.F. Mmm . . . Yes, I was, I thought about an advertisement which seemed to be in the Readers Digest.
- E. Yes.
- K.F. And it was from a shop called 'Jock's' which had a 12 per cent reduction on carpet slippers, and I remembered reading odd things about slippers, and there was no price of the

slippers in it That's all there was But something else came after - the shock of hearing you waken me has made me forget what you said I was doing just before you rang, I think No, I can't remember.

E. What was this advertisement saying about carpet slippers?

K.F. . . . Well, there was one white pair, or perhaps lined with white . . . and . . . I can't remember anything else it said - unless something to do with (inaudible) and you know a kind of slipper like a moccasin, well, you know how it has a sort of lap on the front of it - I remember reading the word 'lap'.

E. Mmmhmm. Lap?

K.F. Yes.

E. In the advertisement, it said 'lap'?

K.F. Yes. It was the moccasin style that it reminded me of - at least, I think it is - unless it's rationalisation.

E. Good. You still think that you were awake?

K.F. Well, I'm not sure, now that you come to mention it. I feel so much more awake.

E. Mmmhmm. Have you ever in actual fact read or seen an advertisement like this?

K.F. No, never.

E. So you imagined it?

K.F. Yeh. Oh, definitely, yes.

E. But you think you were imagining it while you were awake? You were fantasying, is that it?

K.F. Yes. Well, a little before I knew I was awake - well, I knew I wasn't properly asleep. I can't describe it. I think I was dreaming, actually, now I come to think of it.

E. What in fact - how would you say, you know, whether you were asleep, dreaming or awake? By feeling or by the way you were thinking?

K.F. By the way I was thinking.

E. Mmmmmmm. And you think that the way you were thinking was more like wakeful thinking?

K.F. There was no imagery.

E. There was no imagery?

K.F. No, I don't think so.

E. Even when you saw this word, there was no imagery? Or rather, you - I mean, you thought about this word?

K.F. No, what I did image, on second thoughts, was the type of advertisement, or the type of printing that you get in the "Reader's Digest".

E. I see.

K.F. And I thought from that You see, there were no Oh, wait a minute, I've remembered something else. Yes, I must have been dreaming. I can remember something else. . . . I may have been shopping or something, but anyway, I was near Tollcross in Edinburgh. And I remember suddenly thinking about an oriental 'type' who had on a turban and I think a sort of cream-coloured silk jacket with white trousers, definitely, with a stripe down one side. And he went into what looked like a bank. But I don't know where this this definitely didn't seem like anywhere I know at Tollcross, but which - at least, at this stage it looked like a bank, and turned out to be 'Kalam Airlines' - spelt K-a-l-a-m. Which seemed very funny to me. I'm not making this up because I

remember this very definitely. I think that's all I remember about that.

E. Mmmhmm. That's all right. Anything else you remember? When did this happen, do you think - before this shoe business or after?

K.F. Oh, I can't remember. It was either just before you woke me up or . . . I think it was just before you woke me up.

E. Just before I woke you up?

K.F. I was possibly starting to dream then. I was just falling into a dream, I'm not sure.

E. Did you dream about this man in colour or in black-and-white?

K.F. I think it was in colour. I can say what colour the front of the bank was - it was a sort of pinky-brown, and I think I can remember . . . well, that the man was coloured rather than - he was definitely Indian.

E. Have you ever remembered dreaming in colour before?

K.F. No, not really. Mind you, in this one I don't think the colours were particularly marked.

E. No. Mmmhmm. Fine. Nothing else?

K.F. No, I don't think so.

5.37 a.m. Onset of REM period.

5.47 a.m. MAUREEN 15 times.

5.50 a.m. Awakened by high frequency tone.

Transcription No. 51.

(Technical fault on tape-recorder initially and first part of dream report had to be repeated.)

E. Can you start from the beginning?

K.F. From the beginning?

E. The business about the cat.

K.F. That was the last bit of my dream.

E. Yes. Can you describe that again because -

K.F. Yes. Well, I dreamt that I was sitting in Geography lecture and I was fairly near the back of the class, and we brought in a cat. I don't know if I brought it in or anyone else did. It was a ginger cat and it - we let it climb all over the tables, for some reason or another, and then (inaudible) catch it in a queer tin. But apart from that, I don't remember anything else about that. Dr. Eliot was lecturing, definitely. I think that was all there was to that dream. The one before that was also rather vague, but bits of it I can remember quite well.

E. Mmmhmm. Can you describe those bits?

K.F. Yes. It seems to be a curious mixture in places, of the refectory, the University refectory, and my old school. . . because we seemed to - we went to eat, well, a group of us, a mixed group, and we were going to eat, and we were also going to hand in some library books - no, we were going to buy some library tickets, I don't know why. Anyway, we all went in to eat, and this part of it, I think, was in something like the refectory, and the only thing I can tell you about why I think it was the refectory was that I can remember smelling coffee.

E. Smelling coffee?

K.F. Which smelt like refectory coffee.

E. I see.

K.F. Or possibly tasting it, but there's nothing else I can remember about that. I can see the old school, though, definitely, and coming out of the meal

E. You had a meal?

K.F. Well, I think so. I can't remember anything - I can't remember having it. But I think we came out of the meal and . . this is where we came to the entrance hall of the school, which was empty apart from - and not fully lit - but there was a servitor sitting in it at the table, a kind servitor. And we walked up to him and, I think, either bought library tickets from him . . . and then he said something . . I don't know what . . . No, I can't remember what the servitor said. Anyway, we bought library tickets from him and we were just going to go along the corridor which led off this entrance hall to one of the classrooms. And it was exactly a quarter-to-seven. I don't remember seeing the clock, I just - well, I didn't but it wasn't any school one. It was exactly a quarter-to-seven, and at that moment a girl ran up - she was wearing a cloak, well, one of these raincoats without arms - it was a cloak raincoat and she was panting like mad, and this was the minute - it was a quarter-to-seven and it was a minute off the time she had to buy library tickets or hand in her library books, or something. Anyway, she ran up to the servitor and managed to get her library tickets, or hand her book in, and then we all adjourned to the corridor. I can't remember any more in that direction. Possibly it led to the lecture room.

E. But the lecture room was in the University?

K.F. No, I can't remember it being like a University lecture room.

E. But Eliot, Dr. Eliot, is a University lecturer, is he?

K.F. Yes. I can tell you what he was wearing, too. It wasn't a University lecture room, though. He was wearing a checked sports jacket. I don't remember any more about the people.

E. About what this servitor said. Did you remember it a few moments ago and then forget it again, or . . . ?

K.F. No, I didn't remember it.

E. You haven't remembered it at all?

K.F. No. He did - I remember him saying something which I should remember, not because it's important but it was clear in the dream.

E. I see. You don't know what it was about?

K.F. No. I think it was a fairly nondescript comment - something like "That's right, get your tickets out here", or something. I'm not sure what it was.

I. I see

K.F. I seem to be only getting scraps of dreams.

E. No, that's all right. One doesn't always get a continuous one, anyway. Was it in colour?

K.F. Well, I remember the tom - the cat, was ginger.

E. I see.

K.F. I'm not sure if they're in colour or not. They're definitely not in vivid colours at all. But I can definitely remember the cat was a ginger cat, so it must have been in colour.

E. Good. Nothing else you can remember?

K.F. No.

7.02 a.m. Onset of REM period.

7.11 a.m. CAROL 18 times.

7.13 a.m. Awakened by high frequency tone.

Transcription No. 52.

E. Been dreaming?

K.F. Not very well, I don't think. Not very much.

E. Mmmhmm.

K.F. I'm dreaming about a list of things I might dream about.

Really, I thought you had given it to me.

E. I see.

K.F. And I think it was in pencil, scribbled in pencil. It was a list of things like: 'laughing', 'crying', and a whole list of things like that. There must have been five - five under each number and about twenty numbers.

E. Mmmhmm. Can you give me any more examples?

K.F. No, I don't think so. . . . I can remember you saying to me, "Here's a list of things which you are liable to dream about - which you're likely to dream about". . . . There was something else . . . not come back yet.

E. You read each thing, did you?

K.F. Yes - no, I didn't . . I was just glancing at the list. No, I can't remember reading each thing on the list. I didn't think I was asleep, actually.

E. I see.

K.F. And I thought I was - I think I've been dreaming that I haven't been able to sleep very well because . . . I was reading that to try to put me to sleep.

E. Mmmhmm.

K.F. There was another dream . . . (long pause) . . . I was dreaming that I was staying - it's my friend's mother whom I was staying with over the Christmas holidays - it wasn't her shop at all - she had a post office - it wasn't her shop at all. But the first thing I can remember is that at one end it was like a post office, and in the middle, it was like a shop that sells electrical goods and records. I remember the records. I can't remember anything else, though. And my smaller brother, Roger, was there, because I wandered into the shop and I'd just got half-dressed. I'd just got up and looked my usual self, with hair all over the place, and I had only one pair of socks on and one sandal . . or was it . . or two sandals . . just one . . one . . . no, I had one sock on. This was complicated because at the moment I'm wearing two pairs of socks, and my brother said, "Oh, look, there's Maureen!", and this caused some embarrassment because she was - because I was half-dressed. Anyway, I didn't see her - she was at the far end of the shop and she was with her sister. And then . . . then I went back into the post office bit of the shop where there were two very small telephone receivers.

E. Mmmhmm.

K.F. And they were listening to something or other. And then I suddenly remembered that "Oh, they'll be listening to the radio because Mrs. Parkinson has her radio connected to telephone receivers to that she can listen to it while she's working in the shop". She hasn't, but this is what I thought. And they were tiny phone receivers, very much smaller than usual, and picked them up and they were playing

the 'Trumpet Voluntary'. Well, I was listening to it on one, and someone else was listening to it on the other - I don't know who it was. Then . . what happened? . . . Oh, yes . . someone snatched the 'phone out of my hand and left a bit of it in my hand and I can still listen to it - it was like as if they left the thing which actually produces the sound in my hand and had taken the plastic piece. After that, I can't remember . . it sort of seems to change the subject and . . . they were rehearsing a play in the front shop. Mrs. Parkinson was directing it, and in it was this I think it was a man, who was fairly . . . well, not what I would call a good actor, but you know, he put artificial inflections in his voice and all the rest. And he was spouting forth. I can't remember what the play was . . . or anything like that. Then . . . there was a woman who . . . started to speak, and she . . oh, yes, she didn't have a particularly nice-looking face, and she had on a sort of beige apron or smock - a nondescript coloured apron and I remember noticing that she didn't have particularly nice looking legs either. I noticed her legs, definitely. They were sort of . . they were the legs that you'd expect to see on a fairly hard-worked housewife of about 30 or 35.

E. Yes.

K.F. And . . . now she started to speak and she also tried to put funny inflections into her voice and tried to overact, and I remember thinking Mrs. Parkinson didn't like this. Well, she definitely didn't, because she made a face and immediately said, "Oh, no, you must try it some other way". Then . . at that point, I thought . . . oh, but . . that Mrs.

Parkinson had a preconceived prejudice against this woman because she was prejudiced against her before she started, so immediately she got up she found fault with her. That, actually, is something that Ralph Parkinson often does but not Mrs. Parkinson, I don't think. After that, I can't remember anything else. That's all I can remember about that . . . rather involved.

E. And the list business came after that, did it?

K.F. Yes.

E. They don't connect, though?

K.F. No, I don't think so.

E. Sorry . . . once again, Mrs. Parkinson, she was who?

K.F. Well, I've a friend called Ralph Parkinson.

E. Who?

K.F. Ralph Parkinson.

E. Oh, Ralph. Yes?

K.F. He does Geography with me.

E. I see. And this is his moth - his . . . ?

K.F. His mother.

E. His mother. Mmmhmm.

K.F. Whom I know because I went to stay with him over New Year.

E. Mmmhmm, yes, I see. Fine. Coming back to this list, you were saying things you were supposed to dream about?

K.F. Yes.

E. You gave me some examples. Can you give me them again, and any others which you might remember?

K.F. Well, I can't . . . that was the last thing I dreamt about, you see, and I can't remember very much about it. But as far as I can remember, there were things like. . . well, the

things - the only things I can remember are 'laughing' and 'crying' and . . . I don't know, but possibly . . . words like 'biting' and 'trying', I think . . . I can't think of any - 'laughing' and 'crying' definitely, but other words I can't tell you. It would be a guess.

E. Yes . . . Good. Was the dream in colour? Or any of them?

K.F. Which one, the first one? I'm not sure about this colour business, because I can tell you colours which folks had on and that I had on.

E. Oh, that's all right. There were some colours, then?

K.F. There were colours but, you see, the thing is that though I can remember the dream and I can remember definitely pictures and the shapes of things, I can't remember seeing colours. Because I can remember I had the green socks on that I have on now - or I have with me now.

E. Yes.

K.F. And I also had the same navy blue sweater . . . and I can't remember what colour the jacket was.

E. Mmmmmhmm. Good.

SECOND NIGHT.

- 3.19 a.m. Onset of REM period.
3.28 a.m. Awakened by passing car.
3.29 a.m. B Stage (with REMs).
3.36 a.m. Awakened spontaneously.
3.38 a.m. B Stage (with REMs)
3.39 a.m. Awakened spontaneously.
3.40 a.m. B Stage (with REMs).
3.44 a.m. MAUREEN 14 times.
3.46 a.m. Awakened by high frequency tone.

Transcription No. 53.

- E. Have you just been dreaming?
K.F. . . . Mmm?
E. Have you just been dreaming?
K.F. Mmm, I suppose so, yes.
E. Mmmhmm. Can you remember what it was?
K.F. No (long pause) . . . Oh, yes . . . I've been
dreaming about something to do with Maths.
E. Maths?
K.F. Yes. Maths class, somewhere. And . . this was held in
the open-air.
E. Mmmhmm.
K.F. And it seems to be linked up in some way with moving house,
which we've just done. It seems to be connected with
Leamington Terrace, but that I'll tell you about
the Maths class first.
E. Yes.
K.F. Mmm . . . I'm trying to remember who the Maths teacher was.
I seem to remember it was rather important. And . . no, I

suppose it will come back in a minute. Anyway, this Maths. class was in the open and . . . what happened? . . . I can't remember any - it's rather broken up, I was getting my book marked for something, anyway. And this seems to connect up with some other kind of book because the . . . scores are written on the front, and they're out of ten, I think. I'm trying to think what other book in real life it connects up with. And . . . he's . . . he's marking my . . . marking . . . giving me my book back and he throws it to me and it's on the front . . . Oh, I know what it reminds me of, it reminds me of an English book at school. I wonder why that should be. Because our English books, I remember, had the marks written on the front and I remember that he always used to go over the lett-, the marks, with his pen. He used to . . . you know how some people, while possibly doodling, will go over a mark once or twice? Well, that's what the marks on the front of our Maths book were like. And he'd changed one or two, which is what this English master used to do. Mmm . . . there was . . . there was a tree in this open-air Maths class . . . which was a funny-looking tree. It was . . . short and . . . well, I'd say it was about nine feet high, tall, and about eight inches wide possibly, and it was . . . it had been lopped so that it was all the same width. It had . . . it just grew up and then one arm, I think, grew out and sort of . . . I can't describe it . . . it was like it had branches rather like . . . I should think one branch was rather like a cow's horn and the other branch sort of stuck out quite a long way and then curved up like horn, so that it looked unbalanced. And . . . I

remember in the dream that we had a break in the class at some time and I left my bag at the foot of this tree. And after the break, the Maths. master asked . . this was my haversack, by the way, which I didn't use to have at school. And after the class, the Maths master asked, "Whose is this heavy bag?". And . . . oh, I'm trying to remember who the Maths master was. Anyway . . and he said . . and I put up my hand and he threw it to me and I caught it. . . well, I guided it to the ground. And . . . there was another bit in it that it seems I can't remember. This is - some other boy's coming into it somewhere. I don't know who it was . . . I can't remember any identities in this dream, I'm afraid. Anyway, this other person, whoever it was, the other pupil didn't want anyone to get hold of his Maths. book . . which was locked in the master's cupboard and we eventually did get hold of it. It was a . . . I can't remember how . . oh, this is annoying. I'm afraid I can't remember it very well.

E. No, that's very good.

K.F. Mmm . . that seems to be all I can remember . . (pause) . . Well, to go back to the changing house part . . . I was dreaming something about changing house and into this came now . . possibly it wasn't changing house . . but anyway, I remember that in what seemed to be one of the houses that runs about . . . oh, let's see . . 53 Leamington Terrace, they were having - I remember seeing in the window of this house, or pinned on to the door . . some posters. I remember these very well. They were going to have a sale, in the back room, or something, and the cost of admission would be . . I can't remember exactly how much . . . The cost of admission wasn't

very much anyway, three-and-six, or something like that. And I remember exactly how the figures in this cost were written. They were written with . . they were written in red with very broad vertical strokes, and, well, they weren't strokes - they had been; you know, they were so broad and thin horizontal strokes. And there was something that was the price of admission, I remember seeing, and I remember thinking, would that be worth going to, because I might pick something up. And there was something else - the price of something else on it, just after it, which was much more, and . . it was . . I couldn't go to that, I don't think. . . . (pause) . . . I can't remember anything more. . . (pause) . . No, I can't remember . . I don't think I can remember any more about either of -

E. Which came first?

K.F. Oh, the one about the posters.

E. That was first?

K.F. Yes. The one about houses, that was . . .

E. What was the last thing you remember, before I woke you?

K.F. I think it was about the Maths, something about the Maths. Now, I seem to think that the fellow whom I was talking about in the Maths class was . . . a boy at school called Richard Bowden. I don't know how, but he was a red-haired fellow . . . He was a funny chap with a sort of highish voice who talked quickly and had nasal trouble because he talked - I think it was him anyway. He was rather . . . always gave me a feeling of . . . that he was an inferior chap. Well, he didn't always, but he gives me now when I think of him. I

think it was him, anyway, whose Maths book was locked in the cupboard . . . And I can't remember who the Maths teacher was.

E. No, it's not ~~too~~ important. What was the last action you can remember? I mean, it was the Maths bit. What do you think happened last?

K.F. Mmm . . .

E. Which part of it came last?

K.F. Now, that I'm not sure of. This . . oh, no, I mean, I thought of this after the dream, but it seems now that it was held in Paris, the open-air bit. I don't know why I should think that, it must be wrong, but the tree and holding a class in the open-air, that probably reminds me of Paris.

E. Mmmhmm. . . But you can't remember what came last?

K.F. No. Either this fellow found his Maths - well, he noticed that the Maths cupboard was open . . now, why was . . it didn't seem to . . . well, you see, the master opened the cupboard and handed me back my corrected Maths book and this fellow said, "Oh, don't do that, you'll let them see my Maths book". And he went out to the cupboard - I think it was either that or the master throwing my bag back to me. I'm sorry, I don't remember this very well.

E. No, that's quite fair. Was it in colour?

K.F. No, not that bit, I don't think.

E. Was any of it in colour?

K.F. Yes, the bit about the poster was. Very definitely.

E. This book which he . . your Maths book, how many marks did it have on it?

K.F. I should say about five. Written down the left - to left-hand side of the front cover.

- E. Mmmhmm. Good. Nothing else which you can remember, no?
- K.F. I can't remember anything more.
- E. Did you say anything in the dream?
- K.F. Yes, I . . well, I can't remember saying anything definite. I remember . . only a very weak "thank you" to him, when he threw my bag to me.

- 6.52 a.m. Onset of REM period.
- 6.58 a.m. LIZ 22 times.
- 7.01 a.m. Awakened by high frequency tone.

Transcription No. 54.

- E. Just been dreaming?
- K.F. Er . . yes . . . yes . . . mmm . . what was I dreaming about?
. . . (long pause) Shall I tell you the bit near the end first?
- E. Yes.
- K.F. Well, near the end . . . well, I was engaged in a job as secretary of the 'New Scotland', I think.
- E. The 'New Scotland'?
- K.F. Yes. The Scottish Country Dancing Club.
- E. Oh, yes.
- K.F. And I was doing it . . . at a table in a corridor at school.
And . . . I remember this because of the windows (inaudible)
it definitely was a corridor at school. . . (pause) . . .
I was giving somebody a row for administration - yet a girl came into it called Catherine Cruickshank. She's the daughter of my doctor. She was . . . I don't know, she didn't say

very much, just sat. Mmmm . . I can't remember what I was saying. I was arranging something, I think, and cursing the inefficiency of those who had gone before me. And I cursed this fellow, David Bath.

E. David what?

K.F. David Bath, who was . . . who had never had anything to do with the 'New Scotland'. He was a Scoutmaster, and I said to Cath . . . oh, no, possibly it wasn't Cath that was sitting there because someone said, "Well, how about Cath? Whenever she wants to know anything, she rings up David Bath". And I said, "Yes, well, no wonder he's been - she's been in the Society three years and he's been to Exeter for the last two, so no wonder she 'phones him up when she wants to know anything". . . . There's a vile joke coming at the end of this - prepare yourself. Really vile!

E. Oh yes?

K.F. Mmmm. . . I'm roaring with obscene laughter when you woke me up. ~~Mmmm~~ . . I can't - trying to remember it all. . . yes, then . . - I can't remember anything more about that (inaudible) job, and then my brother came along, you see.

E. Mmmmhmm.

K.F. My elder brother, this was. And he sort of leant over me and opened the window and he was throwing olive stones, or something like that, or cherry stones, out of the window. And as he threw each one out, it clanged against the window, and I made some rude comment about him because he was leaning all over me . . well, I made the rude comment because he was leaning all over me that he couldn't even throw them out then - they all hit the window, you see.

E. Mmmhmm.

K.F. And I think I took one and threw it out, but I'm not sure. Anyway, after that, we started looking through a book of . . . I don't know what these were. They were . . . they could have been specimens of . . . of flowers, they could have been sort of marine flowers, or they could have been cacti, or anything. Anyway, I remember all these because they were in pretty vivid colour. And . . . looking through this . . . and I remember saying to him, "Everything seems to be in twos". Every picture, every photograph, there were colour photographs in this book, you see, and my brother had taken them, you see. And everything - every photograph was of . . . in some way made up in a very similar composition, with one thing on one side, either small or large, and one thing on the other side . . . say a flower, or two flowers, growing from a log, and . . . and one large one on the log on one side, and one small one. I'm not sure if there were variations to that, but I remember saying to my brother that all these damn pictures were . . . well, possibly I didn't say 'damn', but all these pictures were balanced in the same way, you see.

E. Mmmhmm.

K.F. And then we came - I'll have to tell this joke backwards, actually. It won't sound like this, but still, because I can't remember the first part of it, you see. But anyway, it's not a joke. He said - it's not a joke to tell about this, anyway. He said . . . no, the name of this flower was in Latin, you see.

E. Yes.

K.F. And it was such that I pointed to it and leant over and said to him . . I just said to him, although what was meant was, "Doesn't that remind you of . . " - if you see what I mean.

E. Mmmhmm.

K.F. "Sit down coitus".

E. Mmmhmm.

K.F. That was what the word looked like, you know, but it was a Latin word. It was the name of this specimen. And we both absolutely roared with laughter at this. It was - I can't remember what the name was but that was when you woke me up, I was just laughing at that.

E. I see. The word looked something like "sit down coitus".

K.F. Yes . . . Now . . there's a dream scene before that one. It was . . well, it may have been part of the same dream. But the minute I can remember is that . . I think my brother and I again . . yes, definitely my brother and I again - that's possibly the linkage between the dreams - were walking across the Links at . . . Bruntsfield Links. And it was at nighttime and the ground was quite muddy, and we walked into the Links and then I said, "Look, there's a sixpence on the ground", and bent down and it was sixpence. And then discovered the ground was littered with shillings and sixpences, and I can remember picking all of these up quite vividly because I can remember seeing each shilling and sixpence quite brightly.

E. Mmmhmm.

K.F. And having the sensation each time that I saw one that you have when you find something. Well, when a Scotsman finds

a shilling or a sixpence lying on the ground . . ! And I remember also seeing cigarette packets and other things lying on the ground. Oh, yes, these were lying on the ground - we discovered that these were - turned out, after we'd been picking them up for some time, they were all lying amongst sort of . . . the sort of things you'd find on the breakfast table - well, on a table, I think. As if the ground had been set for dinner. Well, sort of camping dinner, you know. And this table had obviously been sat at by a group of people. And there were books of 'Teach Yourself German' - I remember that. I remember their colour too. They were a sort of reddy colour, yellow words - that was the cover of the book, though. Books of 'Teach Yourself German' all over this table, you see.

E. Yes.

K.F. Or I think it was 'Teach Yourself German'. The trouble was, German boys came into it. Anyway, there were tents around this sit-down table. And I remember saying, "Oh, these must belong to the German boys", but I'm not sure of . . . oh, some link comes in here I've forgotten . . Oh, I remember . . oh, yes, we were going, so we said we'd hand it in - or hand something in to the shop at the end of Bruntsfield. We were facing the Links, there was only one line of shops on the opposite side of the street. And I've just remembered that I've dreamt about a shop there before. Anyway, we went to hand it in there and he said . . we were going to hand it in to a Lib- , well, a sort of bookshop there so that they'd go and ask for it. And there was some conversation here with the woman who owned the bookshop, I think.

About how they were bound to come and ask for it. And she said, "Oh, yes, they'd come and ask for it. They can come and ask for anything". I can't remember this bit. Anyway, we went inside this place and immediately the sort of context of the dream changed and we were in a room - my brother and my mother and myself. And my mother had on a sort of pinky-red dress (which she hasn't got) and we decided to . . . no, I can't remember all of this bit, but anyway she was . . . we were hurling mattresses around the place, of all things, and she . . . the only bit that I remember vividly is . . . well, she was preparing the room for something, you see.

E. Mmmhmm.

K.F. And there was this filthy mattress, you see, and she picked it up and she got mud - it was sort of black filth . . . she got this muck all over the front of her dress. And I remember definitely thinking sort of "Gosh, what a filthy mattress!" And you know, an old one too. And she put this on the bed and then another one on top of it, and it still wasn't very comfortable, so I suggested putting another one on top of that. Which she did, and I can't remember anything else about that. No, I think that's all I remember at all.

E. Mmmhmm. And that dream definitely came before this one, did it - the one before the one about the flowers and - ?

K.F. Yes. In the order that - I think the six- . . . I think the sixpences on the Links first, and then the one about the bit about the mattress, and then the corridor at school.

E. Yes. You're sure that the one about the sixpences was just now and it wasn't . . it's not the one you couldn't remember before?

K.F. Oh, well, it might be. But I definitely thought it was now, just now. I mean, it all has . . . remembering that thing about school just led . . . as I thought about the one about the school, I remembered the one about the sixpences. It might be the one before but I'm not sure.

E. Mmmhmm. Because how long would you have said each dream lasted? I mean, in real life how long would it be?

K.F. In real life?

E. Well, if the actions which had occurred in those two dreams - you'd actually carried them out, you know, in real time?

K.F. Oh, gosh! I don't know.

E. Just a rough idea.

K.F. Say a quarter-of-an-hour, for the first one.

E. Yes?

K.F. And . . ten minutes, for the second one. Does it have any relation to the time you take to dream it?

E. Yes, it does. How many of these shillings . . ?

K.F. Oh, a lot.

E. A lot? Roughly how many, in figures?

K.F. I couldn't - I lost count. There were so many. Now I kept - starting picking up sixpences and shillings until my hand was full of them.

E. Mmmhmm. And there were about five mattresses, were there?

K.F. No, there weren't five -

E. Three. Three, sorry.

K.F. But there were some good mattresses, I think. They were either propped up in the room - there were three mattresses which were bad mattresses - well, they had all the stuffing knocked out of them and they were pretty dirty.

E. Uhha. Now, these olive stones.

K.F. Yes?

E. Roughly how many of those were there?

K.F. I couldn't tell you at all.

E. You couldn't?

K.F. No. No idea.

E. And these flowers?

K.F. Yes?

E. It was a book, big book, or . . . ?

K.F. Yes.

E. How many did you look at, roughly?

K.F. Well, I looked at about four, I think. It's rather strange, but these . . . about the olive stones, I'll try and count them because they came before the flowers . . Now, he must have thrown three or four out of the window, and I threw one out which didn't hit the glass. But I'm not sure about that.

E. Mmmhmm. It hit the glass, though?

K.F. Mine didn't hit the glass.

E. But his did?

K.F. Yes. But I was annoyed at him for leaning over me to throw them out the window and still not being able to throw them out properly, because I had an argument with him about it.

E. Mmmhmm.

K.F. The pictures . . . they were like something out of 'Geographical Magazine'. The colours. And you know how you can get some

very good close-ups of flowers and things. And they were like cactus flowers, I think, of various sorts. Do you want me to describe them further? I can remember the colours very well. There were purples and yellow and fawn colours. The logs weren't like logs - they were sort of more uniform than logs.

E. These logs, then - you say they looked like logs but they weren't necessarily logs?

K.F. No, they weren't. There was one brown one, I remember.

E. But you thought they should be logs?

K.F. Yes.

E. Mmmmmhmm. This word . . . it was all one word? . . . how long was it?

K.F. No, it wasn't. It was two words.

E. Oh, it was two words?

K.F. Oh, definitely, yes. It was . . . it may have been the Latin word, 'Sed' - 'something', 'something', you see? And I thought it meant . . . you know, it looked exactly like 'sit down coitus' for both of us because when I pointed it out to him we both roared with laughter.

E. Yes.

K.F. Well, I think so, anyway. Possibly I said, "Doesn't it look like 'sit down coitus'?", but I'm not sure.

E. Fine.

K.F. I don't see why it should be funny.

THIRD NIGHT.

4.41 a.m. Onset of REM period.

4.49 a.m. SHEILA 21 times.

4.51 a.m. Awakened by high frequency tone.

Transcription No. 55.

E. Have you just been dreaming?

K.F. Yes.

E. Mmmhmm. Do you know what it was about?

K.F. It was about dreaming.

E. I see.

K.F. And it was about dream analysis. And there were only two people doing it. Male and female. And we were doing it from maps.

E. From maps?

K.F. Yes. At least, a lot of it seems to be from maps . . . I think we spent an awful lot of time just sort of comparing maps and matching up maps on the floor. Just before you woke me up, I was fitting a map at the fifteen hundred and fifty two foot mark. . . . (long pause) The people I was doing this with were Liz and Sue. Sue was Liz's best friend, by the way. I don't think I told you about her.

E. Mmmhmm. You said . . . they were both female?

K.F. Pardon?

E. They were both female? Who were doing it?

K.F. No, no. I was doing it with them and we were doing it in pairs of male and female, and there were three pairs doing it, I think.

E. Three pairs?

K.F. I think so, yes . . . possibly only two. I can't think who the other pair were. But it just sort of seems that it was three.

E. Why did you - ?

K.F. I think we swapped round.

E. I see.

K.F. It wasn't definite partners.

E. But defin- , Sue and Liz, just the two - they . . . took part, did they?

K.F. Yes. (Long pause) .

E. What were they actually doing? I mean, you say they were doing it from maps. How many maps? What did the maps look like?

K.F. They looked like carpets. So much so that they merged into carpets at the end, because we had to straighten them with our feet and shift furniture to compare them, and things like that. But they were definitely dreams though.

E. The maps were dreams?

K.F. Oh, definitely, because that's what --

E. How do you know they were dreams?

K.F. Because I think we had to do it for you, you see? And it was at night, I think, and we had to compare them. I forget what they were dreams about . . . (pause) . .

E. Can you remember if anybody said anything? Or if you said anything?

K.F. No, I don't think so. I remember them saying at the end that she had to compare hers - or that we had to compare them at . . together . . that we had to get two maps

at the - she had put one map's side next to another map and it was slightly overlapping by two feet, so she had the fifteen hundred foot mark at the fifteen hund-- she had the fifteen hundred and fifty foot mark of one map opposite the fifteen hundred and fifty two foot mark of another map.

That's all I can remember and . . . it's strange, this.

E. Mmmmmhmm. You've no idea how these things were analysed?

K.F. No, not a clue.

E. Yes, and the whole thing seems quite crazy?

K.F. Oh, yes, and it kept changing into carpets or . . . it being the carpets we were analysing.

E. Mmmmmhmm. I mean, when it changed into - what did it look like when it was a map?

K.F. Er nothing at all.

E. I see.

K.F. Just a piece of paper, some of which looked dirty and some of which didn't There should be some more to this dream, I think. I can't think of it.

E. That was definitely the last thing that was happening before I woke you up?

K.F. Yes. But I have a feeling - I can't remember any more dreaming but

E. Was it in colour?

K.F. No.

E. It wasn't?

K.F. How can I (pause) . .

E. You remember something else you said in the dream?

K.F. Yes, or that one of the girls said in the dream. But it was apparently crazy, like "Let's do the symphony one", or

something like that. It was definitely that, or something.

It was Sue who suggested it, actually.

E. The words she said . . . ?

K.F. "Let's do the . . . Pastoral Symphony one", or something. And then moving these maps, and we moved maps just before the end.

E. Mmmmmhmm. She only said this once, did she?

K.F. Yes. It doesn't seem very important. That's all I can remember.

6.06 a.m. Onset of REM period.

6.14 a.m. CAROL 18 times.

6.16 a.m. Awakened by high frequency tone.

Transcription No. 56.

E. Been dreaming?

K.F. Yes . . . (long pause) . . . I dreamt first of all that you called me up on the loudspeaker and said that I must go to the doctor tomorrow and get something to make me less sleepy. And then . . . some of my pills for the skin disease, actually, that I used to get. And then after that, a small child came in - actually it was a double room. A tiny little girl, I think. And after - a charming child it was, she had a skin disease. Anyway, and she sat on the bed, you see, and she was with her parents who were very - half-demented because she had this skin disease. And I had been talking to this girl and her parents, and I gave the father one of my tablets all crushed-up, to calm him down. And the mother was very small and wizened. And the child had on a blue, flowery

blouse. . . And navy trousers, I think. . . (pause) . . .
You came through and told me to crush up this (inaudible)
thing for the man. And I was just on the point - I remember
thinking of asking you what the most interesting thing
that had happened to you on an evening was, and you would
comment on what had happened to you or what.

E. Mmmhmm?

K.F. I can't remember if I had or not . . asked you. I think
that's all I remember dreaming.

E. Mmmhmm. Good. When I called you on the loudspeaker,
what did I say?

K.F. Oh, yes, you said . . "You must . . you must get something
to make you less hazy. You must go to the doctor tomorrow".

E. Those were the words I said, were they?

K.F. Yes.

E. Mmmhmm.

K.F. "You must go to the . . " . no . . "You must go to the G.P.
tomorrow", I think you said, "and get something to . . and
tell him 'I want something to make me less hazy'". I think
that's what you said.

E. And then this girl came in?

K.F. Yes. Oh, she was only about two.

E. Did she have a name?

K.F. No. Anyway, she was just about to cry . . but sat on the
bed. I thought she would burst out crying but she didn't.
And she said, "Look what I've got. I've got a skin disease"
or something like that, I seem to remember.

E. And what did you say the skin disease was?

K.F. . . Oh

- E. You thought it was . . . ?
- K.F. Oh, I'm not sure. Sciatica, I thought. But I don't know what that's like . . . I'm sorry, what were you going to say?
- E. What were you talk- . . . you were talking to her, what did you say to her? What were you talking about?
- K.F. . . . No, I can't remember. I can't remember whether I gave her one of my pills or not. No, I can't remember anything I said to her.
- E. No? And I told you . . later on, I told you to crush up these pills and give them to the father?
- K.F. Yes.
- E. Do you remember the words I used?
- K.F. No. In fact, the idea to crush them up may have been my own. But I definitely asked you, "Shall I give him one?", or something like that.
- E. Mmmhmm. Did you talk to the mother and father at all?
- K.F. No. I may have talked to the father.
- E. Mmmhmm. You can't remember if you talked to him?
- K.F. I didn't talk to the mother.
- E. Mmmhmm. (pause) But the first thing in the dream you say you heard me calling - ?
- K.F. Yes. Have you? It's funny how much I dream of the present circumstances.
- E. Yes. Well, you're no doubt influenced by the experiment. . . . Good. Is there anything else you can remember?
- K.F. . . . No, I don't think so.
- E. Well, it was obviously in colour.
- K.F. Yes.

- 6.51 a.m. Onset of REM period.
7.01 a.m. MAUREEN 19 times.
7.04 a.m. Awakened by high frequency tone.

Transcription No. 57.

E. Just been dreaming?

K.F. . . . Yes. . . . Ralph and myself and Maureen had been to a dance somewhere. And we were trying to get home and we went to Dalmahoy. Do you know where that is?

E. No.

K.F. It's about nine miles out of Edinburgh . . To meet someone. And we went there and there was this party on there. And we sort of walked through this big house and the party sort of broke up after that. I remember looking for faces that I knew and there was no one there. And we sat talking about how we were going to get home, and she'd get home. That's about all I remember. I think some more came before that. . . (pause) . . . Oh, yes, Ralph . . Ralph was telling me about some time he had been out with her before.

E. Been out with . . ?

K.F. Maureen before.

E. Uhha.

K.F. Next, what did we do? . . . This was at the house; she left the room for something, unspecified, and he was telling me how they had gone out together before. I can't remember . . . I remember feeling jealous, anyway. (inaudible) I remember him saying that they'd been out there before and he'd grabbed hold of her and said, "I want to speak to you" and she said, "Yes", and he'd said, "I have terrible dreams about you", and she said, "Oh, do you?", and he said "Yes".

And he was completely put off by her lack of . . . by her frank answer. . . . That's all I can remember, I think. I can remember seeing faces of people at this party.

E. Mmmhmm. How many?

K.F. Oh, hundreds.

E. Hundreds?

K.F. Oh, I suppose a hundred people. But faces of people I used to know in the Youth Fellowship . . and that . . who would have been at that party. It was at Dalmahoy - it's a Youth House.

E. Mmmhmm. Where is this?

K.F. . . . Out on the West Calder Road . . about nine miles . . . by Dalmahoy Golf Course. I can't remember where we had been before that

E. Do you remember anything else that was said - you said, or she said?

K.F. . . . Oh, yes. . . just a minute, now . . . Oh, yes. . (long pause) I had in my hand a round bar of soap, which was dull green in colour, which had on it . . . 'New Cold Scent', I think . . . and I . . remember Ralph . . I think . . said, "Yes, that's the stuff she had on before", and I said. . . "Oh, yes, but it's not the stuff she's got on tonight" . . . I think . . yes . . and I know she had on a purple dress too - a purple skirt, rather - a very woollie purple skirt . . vivid purple . . I dreamt this one all in colour, Technicolour

E. Mmmhmm.

K.F. I remembering being . . an immense party . . and we went through all the rooms looking for Mr. McCutcheon, who was the

person we had gone to see . . and . . the party was breaking off obviously and everyone sort of looked at me as if I was half-crazy . . and would hardly speak to me . . you know . . and . . . as though I was a gatecrasher or something . . and I probably had great thoughts about the stupid Youth Fellowship lot . . well, that was in two rooms and then we wandered into a back room where there were a whole lot of teenage types who were so stupid that we didn't care about them . . and then we went to the end of the dream. We were wondering how to get home and this fellow walked in who . . he's a fellow I'd seen before at the 'Varsity. He's not a member of the Youth Fellowship, I don't think. . . .

E. Mmmhmm.

K.F. . . . He was . . small and rather nondescript . . I think I must have seen him at a party before actually . . and he said, "Oh, you'll have to try and get a lift, but all the people going from this place are already taking somebody" . . and then . . . I don't know why I should dream about . . I don't know him at all . . .

E. Mmmhmm.

K.F. . . . A small fellow . . . I don't know his name or anything . . . Oh, wait a minute . . one of the teenagers in the back room - it just occurred to me what one of them was . . I think she was . . she reminded me of a small 16-year old or 15-year old girl who was working in a canning factory that I was working in three years ago . . .

E. Mmmhmm.

K.F. . . . She was a wee tart, if ever there was one . . Anyway, she was quite a character. She would chew gum the whole

time and sing pop songs.

E. You thought of her in the dream as being this girl?

K.F. It just occurred to me - I recognised her at the time you see. She had hardly any effect on me, but now I realise what it was in her I recognised.

E. Mmmhmm. What was her name?

K.F. . . . Oh

E. Doesn't matter.

K.F. No, I can't remember.

E. Mmmhmm. Good.

K.F. That's all I remember.

E. That's all you remember? Uhha. Fine.

FOURTH NIGHT.

12.47 a.m. Onset of REM period.

12.58 a.m. LIZ 25 times.

1.01 a.m. Awakened by high frequency tone.

Transcription No. 58.

E. Have you just been dreaming?

K.F. Yes.

E. Can you remember what you were dreaming about?

K.F. . . . Oh . . . Just before you woke me up, I was sitting with Maureen and I think we were discussing what we would wear for this series of experiments. . . But that's all I can think of . . . And what about what I was dreaming about before that ? . . . (very long pause)

E. You can't remember anything?

K.F.

E. This . . you know . . . Well, don't worry if you can't remember. This bit . . just before I woke you up, how long do you think that took?

K.F. Oh, a very short time, I think.

E. Well, how long would you say?

K.F. . . . Oh . . . two minutes.

E. And you were discussing what you were going to wear for this experiment?

K.F. I think so. It's very - I can't remember it well at all.

E. Can you remember anything you said, or she said?

K.F. No.

E. Nothing at all? Can you remember where you were discussing it?

K.F. No.

E. Can you remember any of the things you were going to wear?

K.F. No . . . I'm trying to remember something I dreamt before . .
. . No. . I can't.

E. It doesn't matter. So this last bit, you can't remember very much either?

K.F. No.

E. Did you in fact go through any things that you were going to wear?

K.F. No. It seems . . I can't even verify that that's what I dreamt about.

E. Uhha.

K.F. I can't think of anything.

E. You can't? You haven't even got an image - you can't remember any images?

K.F. A very fleeting one sitting down with Maureen. That's the last one and that's all at present . . . I feel I would remember more if I could just get what it's about . . . but I can't.

4.01 a.m. Onset of REM period.

4.09 a.m. LIZ 13 times.

4.14 a.m. Awakened by final stimulus; followed by high frequency tone.

Transcription No. 59.

E. Have you just been dreaming?

K.F. . . . um . . . yes . . . (very long pause) . . . I have been dreaming that . . . I think . . . Remember you woke me up about twice?

E. Mmmhmm.

K.F. Well . . . each time it seems I have been walking across the Meadows.

E. Mmmhmm.

K.F. I think the last time I was walking across with Ralph Parkinson.

E. With whom?

K.F. With Ralph . . . and . . . when you asked me if I'd been dreaming . . . then . . . I think . . . I was trying to remember if I was in the middle of the Meadows, in the middle Meadow Walk . . . and then . . . something happened and the . . . the dream is coming back . . . I was . . . it's gone . . . trying to remember . . . This part of the dream is still connected

with the experiment in dreaming . . and . . . I can't remember it . . . I'm going to forget it again.

E. Well, start again and it might come back.

K.F. Yes. . . Well . . in the . . . we're in the show - we're doing a show or something . . myself and Ralph definitely being there . . .

E. Mmmhmm.

K.F. . . . And someone else . . . Oh, by the way, we were both singing in a Glee Club show in France last year . . Anyway . . I don't remember how this links up but we were singing something . . . We were singing on a train and . . we were . . . it's difficult to remember . . we were walking round a city - it could well have been Paris, actually - and . . we came . . . I remember thinking of eating grapes, and slightly bad grapes, and we had come to some sort of dingy . . . some dingy part . . and . . according to where we were . . . it was thought. . . it governed what we sang . . . It governed this show in some way. . . the show was a 'cause à voyer', it was quite important, you know, in a sort of weird, unusual way . . and . . someone else went and sang and we had to sing again . . .

E. Mmmhmm.

K.F. And these other people that went and sang, there were three of them on the stage, I remember . . and . . then . . as a gimmick for the end of their last song, they had a snake . . a sort of snake of fairy lights which emerged out of one of the guitars, and the snake snaked out and then snaked back again . . and then there was a flash, I think, an explosion of some kind. . and well . . I remember trying to think . .

to think what we were going to do, because I'd absolutely nothing to say and absolutely nothing to do before this very critical audience I think that's all I can remember.

E. Mmmhmm. You think that's at the end of the dream?

K.F. Yes. I don't know how much I missed out at the beginning. .

E. Well, let's concentrate on the last bit. Can you remember what they were singing?

K.F. No, I can't remember at all.

E. There were three of them you say?

K.F. There three people singing on the stage . . and we were sort of standing right up above them at the back of the 'gods', waiting to go on for our last turn, and wondering what the hell to do . . . I think . . and . . . I can't remember . . .

E. You can't remember any conversation? . . . or phrases?

K.F. No, I don't think so . . . The connection I'm trying to get clear in my mind just now . . . is the connection between wandering around in a sort of . . what seems to be a symbolic city composed of very narrow streets . . and . . almost a maze . . . in fact, definitely a maze of streets.

E. You thought of them as a maze?

K.F. Yes . . . Well, now I come to think of it again (inaudible) Queer feeling, this maze, I don't know . . the thing was . . yes, depending on who we were in this maze or in this city determined what we'd find . . .

E. I see.

K.F. And then there was this barrel-vendor that we got grapes from . . . Anyway, that's all I remember.

E. Mmmmmhmm. Was it in colour?

K.F. . . . Couldn't say, I'm sorry . . . There may have been a little green in it but there was no vivid colour.

E. Mmmmmhmm. Were these singers male or female, or mixed?

K.F. I think they were . . they were male or mixed . . I think they were male . . . No, I'm sure. . . .

E. Uhha. Good. Nothing else, then?

K.F. No.

5.28 a.m. Onset of REM period.

5.40 a.m. SHEILA 24 times.

5.42 a.m. Awakened by high frequency tone.

Transcription No. 60.

E. Have you been dreaming?

K.F. . . . Yes . . . I've been dreaming that I was doing a fourth subject.

E. Doing what?

K.F. A fourth subject.

E. I see. A fourth?

K.F. Yes The subject was Moral Philosophy . . . (very long pause) . . . when . . whenever we found it difficult in this class to answer questions . . and difficult to walk out . . . and we had to relax our faces . . and . . it was one - two, it was one on Moral Phil. or Religious Knowledge . . yes . . and it was that, the class was at the time when there was another class. . It was at three o'clock in the afternoon, and . . . there weren't many of us in it, and

there was a female teacher, a young girl

E. Mmmmmhmm.

K.F. (long pause) . . . No, I'm sorry, I've been having another dream . . No . . I was dreaming I was thinking that I was trying on clothes just then in this class . . and . . I don't know why . . in this class . . I left a copy of Schiller there.

E. Schiller?

K.J. Is there such an author? I think there is.

E. Yes.

K.F. . . . And I went back next week and . . my copy . . as I walked into the class I was carrying something . . . It was a box of books . . and . . (inaudible) . . I remember being slightly 'bolshie' at this point, because I wasn't sure whether I should say to the woman, "No, I'm not staying to your class. I'm going on to another class", or what, and she said, "Oh, you're here, are you?". And there was another woman in the class at this point, an old lady, who looked as if she was a Prof. or something to do with supervising the other one . . and I can remember what she was wearing. She was wearing a blue suit and a blue hat . . and she had the eyes of a blind person . . .

E. Mmmmmhmm.

K.F. . . . You know, gone bad . . and then . . . and the teacher said, "Oh, you're here this week, are you?" You left your Schiller here last week", and I said. . "Yes, I know" . . . and she said, "Oh, you'll find it if you go along to the Brett Library".

E. Brett?

K.F. Yes . . . And I remember feeling very virtuous here because I hadn't a clue where the Brett Library was, but I thought, 'Damn it, I won't just walk out and go and look for the Brett Library'. I just said I hadn't a clue where the Brett Library was . . and she, of course, looked suitably shocked and directed me out, and I walked out . . and I think that's when you woke me up . . and

E. You didn't know either of those women as people? They weren't anybody you knew?

K.F. No.

E. They didn't have any names in the dream?

K.F. . . . No . . This classroom, by the way, I can tell you exactly where it was situated, only there isn't a classroom there. Is this a usual thing? I always seem to think, to know where the place is that I'm dreaming about but it is never the same, it is always completely transformed, but I can . . . This classroom should have been on the . . the door . . as you are going out of the Old Quad, there's a little tunnel at the back, you know . . and the door was on the right-hand side going out, nearer the Quad side of the tunnel . . . and it's a smallish classroom opening out from there between the tunnel and the common room exactly where the gents 'bog' is There was some more in this dream before, I think, but

E. I wouldn't worry too much. Was it in colour?

K.F. Yes, I remember the blue. It was definitely in colour.

E. Oh, yes. How many books? You walked in with these books, didn't you?

K.F. Yes.

E. How many books would you say you had?

K.F. There weren't very many . . five . . . but they were in a funny kind of box, a deepish box . . . just made out of quite plain wood like mahogany or something - it wasn't something like an orange box, it was a special box.

E. Mmmhmm. Did you know what these books were, that you had?

K.F. No.

E. Mmmhmm. You haven't read anything by Schiller?

K.F. I don't think so.

E. Do you know what sort of things he writes?

K.F. I think he writes either philosophy or psychology. I think philosophy.

E. Mmmhmm.

K.F. What does he write?

E. I think he writes . . I think philosophy, and he wrote poetry as well. He's German.

K.F. Yes.

E. Good. Nothing else you can remember?

K.F. I'm trying

6.59 a.m. Onset of REM period.

7.08 a.m. CAROL 25 times.

7.12 a.m. Awakened by high frequency tone.

Transcription No. 61.

E. Have you been dreaming?

K.F. . . . Oh . . mmm In this dream, I was rather interested in this girl . . what was her name? . . . I don't

know. Anyway . . . no, I don't think I was interested in . . . Anyway, I wanted to speak to this friend of mine . . a boy called David Birkett . . . about something or other . . and I went up and I said I'd come up to the C.A. classroom to speak to him, which I did do.

E. C.A.? What's that?

K.F. Chartered Accountancy.

E. Uhha.

K.F. . . . And I went up there. And I passed another woman on the stairs going up, Carella Brown.

E. Who?

K.F. Carella Brown, Blonde bombshell. She was blonde - who was wearing black tights - black slacks . . she often wears black. That's what she had on, I think. And then, halfway up . . halfway up the stairs I met a chap at school who used to be called Baldie Drummond, who made some comment about Carella Brown which I heartily endorsed.

E. Can you remember what the comment was?

K.F. . . . No, I can't . . "Not bad" or something, or "She's all right" . . . Anyway, I sort of chatted to him and asked him how he was getting on, and said I was on my way to see Dave Birkett - they were two chaps at school, you see - and I went to see Dave Birkett, and I went to speak to him, and while I was speaking to him, I noticed that he had part of his hair shaved off as though he'd had a cerebral operation, and . . . and then I saw this other girl . . who . . . I used to know a long, long time ago. I had seen her around the University but had hardly spoken to her at all. Anyway, I chatted to her for a bit and then . . . I think I asked her

if she would like to go for a walk.

E. Mmmhmm.

K.F. And we went for a walk . . . and this walk took us round where this girl used to stay . . and we talked about their house for quite a time. We talked about how it was built by two people called Sally and . . I forget the other person's name Anyway, built by two people . . and. . . this Sally and William . . . they'd all talked about houses and this terrific house and that This girl seemed to have been talking about her own house very impartially, as if she wasn't herself, as if she was talking of . . talking about herself as if she was only a friend.

E. Mmmhmm.

K.F. Anyway . . . she said, "Oh, we went to stay with them down in Nottinghamshire and they had a terrific big garden there, and they also had a flat in Paris".

E. This was in the dream?

K.F. Yes And in the house, there was a huge, huge window which had been built by Sally, a very High Church influence, or something. . . . This was in a new part of the house which had been built on by the family. . . . We never actually got to this house, we were just talking about it, and we sort of . . . we finished talking about the house and I started to ask her how she was getting on at University when you woke me up.

E. You can't remember this girl's name?

K.F. . . . Frances.

E. Mmmhmm. This girl, Carella Brown . . what's she? Among other things.

K.F. Well, she's Dram. Soc.

E. Oh, I see.

K.F. She stays in the flat with the other girls in Regent Terrace. . . . She's a funny girl, she's quite nice but she's quiet and rather snooty . . . and rather sophistiquée which doesn't ring true sometimes. She's got long, blonde hair, and she's quite goodlooking. That's all I can remember.

E. Uhha. Good.

K.F. These chaps from the old school came into this . . .

E. Chaps from your old school?

K.F. Yes.

E. What? Came in before, or . . . ?

K.F. Came in during this. I mean, these C.A.'s, Davie Birkett and Robin Astry, came into it . . . whom I see in the common room actually . . . and Baldie Drummond, Jim Drummond . . .

E. He's not a C.A.?

K.F. No, an architect.

E. Mmmhmm. Anything else you can remember? Was it in colour?

K.F. I couldn't say . . .

E. Can you think of that house? You can't think whether it was in colour?

K.F. Well, you see, I never actually saw the house in the dream. I was just visualising it as I spoke to the girl. I think it was in colour.

E. Fine.

K.F. I think that's all.

SUBJECT R.H.

FIRST NIGHT.

4.30 a.m. Onset of REM period.

4.37 a.m. ROBERT 13 times.

4.39 a.m. Awakened by high frequency tone.

Transcription No. 62.

E. Have you just been dreaming?

R.H. Not that I remember, I'm afraid. . . but let me think.

E. Just lie and think for a minute and you'll find it may come back.

R.H. Oh, yes, I was looking at a film . . . and this was a colour film . . and I was with Sandy, strange as it may seem . . . Now, let me think . . . nothing more seems to come back Yes, there was a rabbit on the film.

E. A rabbit?

R.H. Yes.

E. Did you see it?

R.H. Yes.

E. What was it doing?

R.H. Looking and sniffing. A big rabbit.

E. Mmmhmm. Just one?

R.H. Yes.

E. Mmmhmm. Is this all you can remember about the film?

R.H. Yes. It was a strange film.

E. How do you mean, strange?

R.H. Well, it was sort of as if we were looking at it and yet participating in it.

E. I see. How do you know it was a film?

R.H. Because we were criticising some of the techniques used.

E. Mmmhmm. So you were talking with Sandy, were you?

R.H. I must have been, yes.

E. Mmmhmm. Can you remember anything you said, or he said?

R.H. . . . Oh, yes. He was pointing to something and said, "We used that before", or something. It was one of these - we were criticising the film. Now, what was it we were talking about? oh, I can't remember.

E. Mmmhmm?

R.H. It was as if he'd made the film - see what I mean? - and he was saying we'd used this sort of form of filming or something like that before.

E. Mmmhmm. And the only thing you can remember in the film is this rabbit?

R.H. Let me think . . . (long pause) . . . Yes, it seems . . . it was the sort of film, more like a sort of Mickey Mouse film - you know what I mean?

E. Yes. It was a cartoon?

R.H. Oh, well, I wouldn't go as far as that, but . . . the . . . everything was slightly frightened and distorted - see what I mean? - more sort of lively, I think.

E. Mmmhmm. You know all this without actually remembering any particular images in the dream?

R.H. Yes, these are sort of feelings I'm getting, rather than . . .

E. Mmmhmm. So what were the actual images you had? The rabbit?

R.H. The rabbit. Sandy.

E. What? You saw him?

R.H. Yes. I saw him clearly

- E. Mmmhmm. What was the last thing you remember in the dream?
- R.H. . . . Looking at this rabbit . . .
- E. Mmmhmm. How long do you think you were looking at it?
- R.H. . . . We were doing something else when we came upon the rabbit . . . but what we were doing before that . . . or looking at some other part of the film, or something . . . so the rabbit had only come in sort of recently, towards the end.
- E. I see.
- R.H. . . . I don't think I can remember much else . . .
- E. And it was in colour?
- R.H. Yes.
- E. But you find that surprising?
- R.H. Yes.
- E. Because you normally don't dream in colour?
- R.H. Well not that I remember, but I remember this, that it was in colour.
- E. Good. Nothing else?
- R.H. I don't think so, no. I think I might begin to improvise.

SECOND NIGHT.

- 2.59 a.m. Onset of REM period.
- 3.06 a.m. SANDY 15 times.
- 3.09 a.m. Awakened by high frequency tone.

Transcription No. 63.

- E. Have you just been dreaming?
- R.H. I've just been dreaming, yes . . .

E. Sorry, I hadn't plugged in my head phones. Were you just dreaming?

R.H. Yes, I was . . . Now . . . the very second then I was going into the University library . . . let me think . . . Oh, dear, . . . I was coming away from something before this but I don't know what I was doing before this . . . The University library wasn't like what it is now.

E. Mmmhmm?

R.H. It wasn't situated as it is now . . . And I remember I was walking into it, but before I was in it, outside, someone was calling something . . . but I can't remember what . . . and I've got the sort of feeling it was something Scottish.

E. Mmmhmm.

R.H. But there's no reason for that . . . There might have been a whole lot of cars, I don't know.

E. A whole lot of cars?

R.H. Yes.

E. Where?

R.H. Where I was before I went into the library.

E. I see.

R.H. I'm afraid . . . I can't remember very much more . .

E. So you just remember going into the library, then?

R.H. Yes There were door steps, but it was in a much more open place.

E. Mmmhmm. How do you mean, more open?

R.H. It was an isolated building.

E. I see.

R.H. . . . Yes . . . yes. It was sort of altogether a much more, sort of feeling of being in an open place.

E. In an open place?

R.H. Yes. (inaudible) Otherwise, the inside seemed perfectly the same . . . And I had my black handbag with me.

E. Mmmhmm. . . . This person calling, was it a male or a female?

R.H. . . . I can't remember, but I can vividly remember hearing them.

E. How - there was more than one person?

R.H. Oh . . . no, sorry . . . hearing . . . ah . . . I think I said that because I didn't know whether it was a she or a he who was calling. I think it was more like a male . . I don't know. I think . . guess . . but I can vividly remember hearing it, do you see what I mean?

E. Yes. But you don't know what it was?

R.H. . . . It was repetitive . . and I have a feeling that I asked someone, or someone told me, or something like that, that it was Scottish . . . it is most vague . . , but . . .

E. You say it was repetitive. They were calling the same thing?

R.H. Yes.

E. How many times, roughly?

R.H. . . . More than four, let's put it that way. I can't be more specific.

E. Mmmhmm.

R.H. . . . I'm sure there had been a whole lot of things before this, but I can't remember.

E. When you say - going back to the place the library was, you say it was open?

R.H. Well, I have the sort of feeling that there weren't buildings in a quadrangle.

E. I see.

R.H. I don't remember seeing the University as it is now . . .
There might have been cars . . a whole lot of cars . . .

E. Was it in colour?

R.H. Well, I had a black handbag, which was vividly black, but
I'll have to think of some more colours . . .

E. When did you notice the handbag?

R.H. In the University.

E. Is it one you actually have got?

R.H. Yes, oh yes, very much so.

E. I see.

R.H. Only it's definite that I recognised it as one I had. I
can't recognise anything else that I was wearing, nothing
that strikes me . . . Oh . . . no, I don't think it was in
colour . . . I remember a marble floor . . a sort of marble
because I remember walking on it and hearing the footsteps
. . . oh, I don't think I went through . . . there were
revolving glass doors. I don't think I went through these.

E. Mmmhmm. This person calling - were they calling to you
or somebody else?

R.H. No, not to me. I think there was some reason but it wasn't
to me. . . . It was a two-syllable word . . . it was very
repetitive . . . It had no meaning to me as such, at least
I can't remember it having any.

E. You can't even remember what it was like?

R.H. . . . Something like 'Sinndy', or something like that.

E. Like - could you say it again?

R.H. 'Sinndy' . . . again and again.

E. That doesn't mean anything to you?

R.H. No, because I asked someone, or someone told me, it was Scottish, because it just didn't mean anything.

E. Good. Well, that's all right.

R.H. I'm sorry it's nothing very splendid.

E. Doesn't matter. Nothing else?

R.H. No.

4.54 a.m. Onset of REM period.

5.03 a.m. MICHAEL 23 times.

5.06 a.m. Awakened by high frequency tone.

Transcription No. 64.

E. Have you just been dreaming?

R.H. Yes, I have indeed . . . Sunbathing at Rosslynlee . . I was with other people . . yes, there were lots of us . . Now, this was in colour definitely . . . Yes, I can see it now, Rosslynlee We were sunbathing on different coloured rugs . . I have a feeling I was talking or someone was talking to me, but I can't remember what about . . . No, I don't seem to be able to remember who the other people were.

E. How many other people were there?

R.H. Quite a few . . quite a few . . . Now, 'what do you mean by that!' . . . I have a feeling there was distinctly more than ten . . . I have a feeling I got up but I don't know . . now I'm beginning to wonder whether I did . . . it's not very clear . . . I think I was younger, I don't know . . I got a feeling I don't suppose so . . but I think I was . .

Yes, I think I was . . . I think they were all younger. I think I was with a whole lot of younger people.

E. How much younger?

R.H. Ah . . . well, back when I was a child but not too far back (inaudible) . . . I'm not certain about it. I just got a sort of feeling that I was, say . . . younger, anyway . . .

E. What's the last thing you remember?

R.H. The first time it was very muddled. I think I was just about to get up and walk across the road . . I don't know where, but I think that was the last one . . . I'm not nearly so clear here as I was about the others

E. You say you were talking. Do you know who you were talking to? Or were they talking to you?

R.H. I think there was one person much older than us.

E. Male or female?

R.H. I think it was male must have been a man . . I don't know, can't see anybody definitely. . . It was a sort of main figure . . and . . . whoever they were, he was, she was, I feel that they were talking.

E. I see. But you've no idea what it was about?

R.H. . . . Wait a minute . . . oh, yes, something . . . it might have been something about not getting too sunburnt, or something. . yes . . . because someone said that at one stage, about not getting too sunburnt.

E. So you can't remember anything else?

R.H. . . No . . except that I know it was in colour.

E. Mmmhmm. These other people, did you know them? I mean, not now but in the dream?

R.H. Yes, I have the feeling that I knew them.

E. You saw them all at once, or one at a time?

R.H. Oh, all at once, all at once . . . It was a very normal dream, this, it seemed to me. No incongruous things happening, or strange colours, or strange feelings, or anything. All very normal.

E. Fine.

R.H. But not very clear, I'm afraid.

E. Nothing else?

R.H.

6.10 a.m. Onset of REM period.

6.17 a.m. EDWARD 18 times.

6.20 a.m. Awakened by high frequency tone.

Transcription No. 65.

E. Have you just been dreaming?

R.H. Yes . . . Now . . . This was full of action. There were 'Goodies' and 'Baddies', very much like a (inaudible) I thought of it sort of, partly anyhow, as a stage production, a strange thing to do, but to begin with anyway I had the sort of feeling that I was apart from it Well, there was a girl at school called Helen McKechnie, and she was cast as a 'baddie', and she had these sort of hirelings - two very unpleasant characters, and there was a splendid hero, . . . Let me think what happened next There was a splendid fight on-stage which I participated in, at least I didn't but I was there

. . . . tables being upturned and things being thrown . .
I don't know what it was all in aid of . . . again I . .
no, I don't . . . let me think . . . well, everyone was
talking, and one of Helen's lines was that her father had
been rescued from Tristan da Cunha.

E. Uhha.

R.H. . . . No, it was her grandfather.

E. Her grandfather?

R.H. Her grandfather, yes One of the tables that was up-
turned was one that we have in the house, I recognised it
. . . a butcher's table. I have a strange feeling that
this was again in colour . . . The scene I had with Helen
was not on the stage, if you see what I mean; it was an
occurrence in the dream before that. Then I had (inaudible)
dissociated as if looking at this. Now, what was it on
the stage? It seems slightly familiar to me. Whether I
had seen it in a play, or a film, or read about it, or
dreamt something like it, I don't know, but parts of it were
very familiar. But I can't remember what was happening
on the stage. The fight took place in a room off the stage.

E. Who was the fight between?

R.H. The hero and the two 'baddies', the two villains.

E. Mmmhmm. You don't know who took those parts?

R.H. The villain was a typical villain, but I don't know him very
well, something like the 'baddies' in films, you know.

E. Did you think of them in these terms in the dream?

R.H. . . . Oh, no . . . ah . . . now . . . Well, you see, this was more
muddled than the last dream, because the scene shifted from
me being dissociated from it, in which case I thought of

them as sort of characters and not as people, but then, before and after this, I was participating, in which case I probably thought of them as nasty people. I know that sounds rather muddled. In the scene of the fight, for instance, they were definitely unpleasant people, and very real. Great big people.

E. The terms 'goodie' and 'baddie' . . . ?

R.H. No, no, that was description.

E. Can you remember any more lines that were said?

R.H. . . . Not a line, I'm afraid, but when Helen said that line, we were standing in a room, which I have a strange feeling had pictures in it, sort of Art Gallery type of room. Now, what else was said? . . . No, I can't remember . . . I asked her some questions about it but I can't remember what she gave as answers. I asked her how she was doing because I believe she was at University although I had never spoken to her for about four years, I suppose.

E. Mmmmmmm. Do you remember the questions you asked her - I mean, literally?

R.H. . . . This is not actually literally, but I don't remember vividly like I do her lines, but something about 'What subjects are you doing this year' or something like that, and finding out what subjects she was doing at University, but she either didn't hear or she didn't pay any attention because I didn't get any answer from her.

E. So what did you do then?

R.H. I don't know whether it was then she started the line about her father, her grandfather, coming from Tristan da Cunha, but she said something entirely irrelevant to me, at least

irrelevant to my question, and then I can't for the life of me think how that scene ended at all. I can't think, you know, what the denouement was, but after that I . . . was one with me dissociated like a stage . . . the hero entered during this scene . . . and what did he say? . . . I can't think of any words . . . I have a strange feeling the hero's name might have been Chizario, but whether I am making it up or not, I don't know.

E. Chizario?

R.H. Yes.

E. You can't remember any lines?

R.H. No, I don't think so.

E. What was the last thing that happened? The last few things?

R.H. The fight was in progress, the splendid butcher's table was upturned, and there was a staircase on - off from the . . . it can't have been a complete room, it must have been a sort of hall, I think, but up the lefthand side was a staircase, and some of the fight took place in the hallway up to the staircase. Before the hero entered, I was there with the two 'baddies', the two 'baddies' were talking. Now, whether they knew I was there, I don't know, but they were talking together on the other side of the room, as I looked at it, on the righthand side, but what they were saying I can't remember. This is all what happened before you woke me . . . and I don't know how the fight started, anyway the fight was going on. That's the last thing I remember, but I can't remember the fight very clearly except the tables being over-turned and things being thrown.

E. Mmmhmm. Was it in colour?

R.H. I think so, but I'm not so definite about it as I was with the other ones, which I know were in colour. I'm trying to think if I remember seeing a colour . . . Yes, I think it definitely was . . . Yes, I think so.

THIRD NIGHT.

4.04 a.m. Onset of REM period.
4.11 a.m. MICHAEL 20 times.
4.13 a.m. Awakened by high frequency tone.

Transcription No. 66.

E. Have you just been dreaming?

R.H. Yes It's gone completely at the moment The very last thing, as far as I can remember . . . I was reading a book about, I think, poetry. It wasn't actually poetry but a book on poetry . . . I vividly remember seeing the words on the page and so on, which is unusual because I don't usually see the words, I just see pictures, but I remember seeing the words.

E. Can you remember any of these words?

R.H. It was comparing two styles, and citing examples . . and I remember something about a queen . . . I think that's all I can remember.

E. You remember seeing something about a queen?

R.H. . . . Yes It was comparing these two styles, and gave a whole lot of examples. The style he was advocating was more simple rather than a sort of more complicated and heavier style of the one that had gone before . . . and that's all.

- E. Mmmhmm. You can't remember any of the examples?
- R.H. . . . (very long pause) . . . There might have been something about trees, and there was something about a queen, but I can't remember actually any sort of phrases.
- E. How much do you think you read of this? How many pages, how many lines?
- R.H. Well, actually the page I'm trying to remember at the minute was one of a new chapter. I remember the chapter, the new chapter, on a new page . . . Yes, it isn't the beginning of the book. Let me try and think what came before, which I think I did read, at least some of it anyway. This isn't the beginning of the dream, I know.
- E. Mmmhmm. So the dream really just consisted of reading this book?
- R.H. Yes, it's dreadful.
- E. It's not a book you know?
- R.H. No.
- E. You don't know where this took place?
- R.H. No
- E. Was it in colour?
- R.H. No It was by a man.
- E. By a man?
- R.H. I think so.
- E. You can't remember his name?
- R.H. No

6.41 a.m. Onset of REM period.

6.48 a.m. ROBERT 15 times.

6.51 a.m. Awakened by high frequency tone.

Transcription No. 67.

E. Have you just been dreaming?

R.H. Yes . . . A whole lot of questions . . yes, it's Logic . .
There are about eight of them, I should think, essay-type
of questions . . . Now, I was discussing it with someone
. . . whom I . . wasn't anyone particularly familiar to me,
I don't think. There was a whole lot of room, with a whole
lot of other people. We were all sitting down working. I
can't remember whether any of the people were familiar to
me or not . . . I don't think they were.

E. Mmmhmm?

R.H. . . . The paper itself was badly printed.

E. Can you remember any of the questions?

R.H. Only one particularly. It wasn't Number Four, because
there wasn't a Number Four. It was somewhere in the region
of Four but the numbers went sort of One, Two, Three, and
then there was a gap in the middle, and this was something
like - it started to go on to letters. This was something
like NZ or something strange, and it was a very long question
which I don't really think, on looking back, was anything
to do with Logic, only parts of it. There was a very long
list of logical symbols - I think they were logical symbols
. . . dots and things like that. I don't know if you have
ever done Logic?

E. Yes.

R.H. And then we were going to be asked to do a whole lot of

things with these, and a whole lot of - list of - terms which . . . now, I don't know whether they were real logical terms or not, only at the time they made sense to me as I would know what to do with them. Can you see what I mean?

E. Can you give me them vaguely? Can you remember?

R.H. The trouble is if I could remember them, I would know if they were merely (very long pause) Another thing. It was rather strangely worded in that the one that I do remember we were instructed to do this, and then you read on and it said to get enough interest in it to find out, and gave a whole long list of others. And at that point, I remember vividly getting an image of a person who was a Logic lecturer, a person called Mr. McGower, at that stage . . . no other . . . I don't know why. We had to raise enough interest in it to gather more and more (inaudible) struck me as being rather strange.

E. Sorry, I didn't catch that.

R.H. We had to - I think the actual words were 'raise enough interest' or something like that, to go on to do a whole lot of other things, also logical terms in the way of manipulation symbols . . . Now, I don't know whether it was in colour or not . . . I think it probably wasn't

E. You can't remember any more of these questions? I mean, not so much in descriptive terms as actual words, what you said, or anybody else said?

R.H. . . Well . . the person who was discussing it with me when you woke me up had previously - I think it must have been rather something like an examination hall, because he had gone up to the front because this thing was badly written, and previously he had been with a girl, and she had been

discussing what question she was going to do, and she was going to do this one with a whole lot of symbols in it. She said she had been reading about them and was going to have a bash at it. I don't know her actual words, those are only my - what I remember of them . . . Wait a minute. . it was in colour because she was a blonde.

E. A blonde?

R.H. Yes. Extremely 'wah-wah'.

E. Sorry?

R.H. Extremely sort of "You know", sort of business.

E. Uhha. What was the expression you used?

R.H. It's an expression of my own - 'wah-wah'.

E. Did you think of that in the dream?

R.H. . . . Oh . . . no, but I got hold of this feeling when I was in the dream that I didn't particularly like her.

E. It was the way she spoke?

R.H. Well, it was something to do with that. It's not a cause but only a symptom . . . I can't remember any more of these symbols. I remember the dot, which means 'and', as far as I can remember, and there might easily have been a lot more, like these wedges and hooks. I can't see them as well as I see the dot.

E. I see. The dot was - ?

R.H. I can remember that. In front of the long list. There was a sort of oak floor, sort of parquet flooring, or something like that . . .

E. Good. Anything more?

R.H. No, I can't remember. I wasn't particularly interested in this question until I started discussing it with the others.

I was going to do another one. I can't remember anything about it.

E. Good. What was the actual sequence in the dream?

R.H. Yes, that's come all disjointed - either I was thinking about it by myself, or something like that, and near me there was a man talking to a blonde; and the blonde, I don't think - couldn't read the question or make out what the number was, so she sent up this man to ask, and he came back and he stopped and discussed it with me, and that's about where we were.

E. I see. When I woke you up?

R.H. Yes.

FOURTH NIGHT.

4.02 a.m. Onset of REM period.

4.13 a.m. EDWARD once.

Awakened by stimulus for 30 seconds.

4.15 a.m. EDWARD 3 times.

4.16 a.m. Awakened by high frequency tone.

Transcription No. 68.

E. Have you just been dreaming?

R.H. Yes . . . My dream was about a man who was sitting on the ground digging out a gourd.

E. Digging out a gourd?

R.H. Yes I think this was outside . . . I don't think it was in colour . . . and I am not at all conscious of ever - there were no words spoken, and I was never conscious of seeing myself in this setting. . . . But I see this man and

he was digging out this gourd, a lovely, round gourd . . . with a knife . . . It's strange, but I have a sort of feeling that before you woke me up I was saying to myself, 'Am I dreaming now?'. It's possible - I had a sort of feeling that while watching this man cutting out this gourd I was asking myself whether I was dreaming or not.

E. I see.

R.H. I distinctly remember this bit . . but perhaps that was wrong.

E. This is while you were watching?

R.H. Yes.

E. Did you feel awake or asleep at the time? Did you think you were awake, or something?

R.H. Yes.

E. And yet you still saw him?

R.H. Yes.

E. I see You say you didn't know if it was in colour?

R.H. I don't think so. No, I can't remember any colours of the gourd or anything like that, nothing sort of bright hit me.

E. Uhha. This gourd - I have an idea what it's like -

R.H. It's a sort of thing like a cucumber only round. When you dry them and cut them out, you can use them for keeping - as a cup.

E. Oh, yes, that's right. And then, after you thought, 'Am I dreaming this or not', what happened?

R.H. He went on cutting out the gourd.

E. Oh, I see. He just went on?

R.H. Yes.

E. Just the one?

R.H. No, there was - I can't remember anything of the setting, or anything. All I can really remember is just him sitting cutting out the gourd and me thinking that, well, 'Am I awake'.

E. Yes. He just carried on?

R.H. Yes.

E. And that's the last thing you remember?

R.H. Yes. Well, I have this sort of strange feeling of thinking that I must look around and see if there is anything else, in case I have to remember it.

E. I see.

R.H. It really is strange, but I distinctly get this feeling.

E. Do you think you were awake, when I made that noise, or not?

R.H. No.

E. You think you were asleep?

R.H. Yes.

E. I definitely woke you up, did I?

R.H. Yes.

E. I see. Good. Then you can't remember anything that happened before this?

R.H. No.

E. Well, that's all right.

5.34 a.m. Onset of REM period.

5.43 a.m. SANDY 6 times.

5.47 a.m. Awakened by high frequency tone.

Transcription No. 69.

E. Have you just been dreaming?

R.H. Yes. You may not believe it but the same thing's happened again, in which I was asking myself whether I was dreaming.

E. Really? What was your dream?

R.H. . . Yes, now . . . I was walking along a passage - down the underground passage down underneath the Old Quad there in Chambers Street, . . oh, yes . . I ran into . . now, who was it? . . . but somebody I knew who was doing psychology, I think And I think she must have been with someone else, a boy, who was doing psychology - something like that, anyway. I somehow got on to discussing with him Maths, and he was going to take a Maths degree or something . . . and discussed trigonometry Now, what did he say? . . I can't remember the actual words, I'm afraid, but I remember trigonometry I don't think I can remember much else.

E. Do you know who the girl and boy were?

R.H. Not the boy.

E. Who was the girl?

R.H. At the time, I knew her face. I can't now . . . I can't remember anything about her, but she didn't strike me as a stranger at the time.

E. Uhha. The boy was doing psychology, you say, and was going to take a Maths degree?

R.H. . . . Something like that. I remember all the topic of conversation was about his doing Maths.

E. I see. That was the topic of conversation?

R.H. Yes.

E. You can't remember any of the phrases at all?

R.H. . . . Well, I can remember trigonometry being mentioned . . perhaps 'sines' and 'coses' and stuff, but now I'm beginning to . . . I couldn't say for certain they were mentioned but I can remember that going through my mind was a whole lot of triangles and 'sines' and 'coses'. Whether that was just because they were talking about trigonometry . . .

E. I see. These things were going through your mind?

R.H. Yes. Oh, yes. I remember seeing triangles and formulae and stuff, but that might have been just what trigonometry conjured up for me rather than that we were actually discussing that. You see what I mean?

E. I see. What was the last thing you remember, then? This discussion . . . you talked about the same thing happening - - ?

R.H. Yes, now, that's the point. When did this occur? I have been trying to work out the time sequence. . . I have the feeling that it was before this, when I was walking along the passage, because the last thing I think I remember was still talking about trigonometry.

E. Mmmhmm. What did you think?

R.H. It's a most strange thing. Yes, it's a sort of feeling that - was I dreaming? I know it sounds daft, but I've never had it before in my life. I think it must be because I'm trying to - sort of subconsciously trying to think about and trying to remember it. I don't know but I've never had it before. But I'm definitely not awake at the time

because you've always wakened me. I can feel myself waking up.

E. You can feel yourself waking up?

R.H. Yes.

E. Mmmhmm. Was it in colour?

R.H. I'm inclined to think no, but I can't remember . . . No, I don't think so. I think I would have remembered.

E. Mmmhmm. Nothing else?

R.H. Psychology was mentioned, because I talked to the girl a little, but again I can't remember the actual words. No, I think that's all.

E. Good.

FIFTH NIGHT.

No REM periods occurred.

SIXTH NIGHT.

3.36 a.m. Onset of REM period.

3.45 a.m. MICHAEL 8 times.

3.47 a.m. Awakened by high frequency tone.

Transcription No. 70.

E. Have you just been dreaming?

E.H. Yes, I think so . . . Just a second, now . . . Yes, now this isn't very clear, but it's economic history, I think I'm reading something, but I remember 'crises' and 'stagnate' . . . and two dates are 1855 and '66 . . . and I think I've shot my bolt . . . Yes, I was reading these in a book but I

can't remember much else, I'm afraid . . . 'ten years' also comes back to me Nothing else, I'm afraid.

E. Nothing else? Were you reading this out loud or . . . ?

R.H. . . . Yes, I think I was . . yes, because I was hearing myself saying this. It wasn't a usual book, so far as I can remember. It might have been notes, or a pamphlet, or something like that. It wasn't a book as such. It was something. .

E. You can't remember where you were reading it, or to anybody?

R.H. I've no background at all. I'm just conscious of hearing and seeing these words.

E. You describe these words. Were they actually joined up - comprehensive sentences?

R.H. Yes, I know what you mean. Well . . yes, but only I can't remember the sentences, these are the only things I remember. I remember the gist of it because I know the bit of history that it is.

E. I see. Which bit will that be?

R.H. Well, all through the 19th century, there were some sort of crises and stuff which were . . . in point of fact, one of the dates is wrong. It isn't 1855, it's 1857, but it's 1855 I remember in the dream.

E. Mmmhmm?

R.H. And this was all I think explained to me, but the actual words I really remember were 'crises' and 'stagnate'.

E. Mmmhmm. Nothing else? Was it in colour?

R.H. No, it was all very dull, black and white.

E. Uhha. Good.

5.01 a.m. Onset of REM period.

5.11 a.m. EDWARD 5 times.

5.13 a.m. Awakened by noise in central-heating pipes, followed
by high frequency tone.

Transcription No. 71.

E. Have you just been dreaming?

R.H. . . . Yes . . . Now . . . Well, this is rather muddled . . .
and I can't remember it very clearly . . . At some stage,
it took place in a big lecture theatre in Old Quad, the
Psychology one . . and also . . there was a lot of discussion
about the interpretation of dreams . . . Now, I think there
was a class on, which I was attending, but somehow the dis-
cussion was going on nevertheless oblivious of the lecturer
. . . . something about crossing the Atlantic . . . Most
of the discussion was between these two people, men, whom
I don't really remember, and don't know if I knew them.
I don't think I did know them . . . I am trying to remember
something else that they said I think my father
was there at some stage

E. What was the last thing you remember?

R.H. Oh . . . well, I'm not very clear because I woke up. There
was no noise, was there?

E. Yes, there was - the pipes there . . .

R.H. Was it the pipes? Well . . because I didn't wake up all
of a sudden . . at least . . Was there a bit before you
talked to me?

E. Pardon?

R.H. Did I wake up before you talked to me? How long?

E. Well, what do you think?

R.H. Well, that's the thing. I thought I did, hearing the banging. Let me try and think beyond that.

E. Yes, you did. That was the banging in the pipes.

R.H. Yes, the banging in the pipes. Well, this is sort of throwing me as to what I remember last . . . It must be walking . . down the steps at the lecture theatre.

E. The lecture was in Psychology?

R.H. Well, it was in that lecture room, you see. I've had Maths there, so I don't know which it was going on.

E. Did you take part in this discussion?

R.H. Yes, I think so

E. You can't remember anything you said?

R.H. Not the actual words . . . "Fifty" sticks in my mind, but whether that's just a fabrication, I don't know.

E. You didn't know any of these other people in the dream?

R.H. I think my father was there, but the other man, no. One of them was saying something that the other disagreed with . . something about crossing the Atlantic . . .

E. Was it in colour?

R.H. . . . Yes, I think it might have been.

E. You think it might have been?

R.H. Yes.

E. As you recall it, can you recall any bit in colour?

R.H. . . . I can't now, no, but . . well, at the time, everyone else . . it seemed to be . . I don't know . . it's strange. I remember seeing everyone else and what they were wearing, but I can't remember now . . . and usually when I'm . . it wasn't so vivid colours as some of the ones I've had, but

usually when I dream with lots of other people in them they are usually in colour. When I dream in black and white, there is hardly any action. But there were not so many people in this, it was altogether quieter and less action . .

No, I think this was in colour.

E. You can't remember anything else?

R.H. It's very strange, because I think the two people who were arguing were not sitting together, which is very strange . . . One of them was sitting down on . . the level below us, because I don't see how they could have been arguing . .
(inaudible) I think I walked down the steps, but whether that was the last thing, I don't know.

6.22 a.m. Onset of REM period.

6.27 a.m. SANDY 21 times.

6.32 a.m. Awakened by high frequency tone.

Transcription No. 72.

E. Have you just been dreaming?

R.H. Yes . . Now . . This takes place in a . . . in some form of hotel, but not one I know, and not a real hotel but only a hotel in the dream world . . . It's in a room with a whole lot of long tables . . now . . there were a whole lot of people, and I think, yes, it must have been some form of cocktail party . . . I saw some people I know . . There was a mother and father, and a whole lot of friends of theirs. I don't know if I was dragged along . . I don't remember . . In colour I think I must have been much younger . .

I'll try and think what people were talking about . . . (very long pause) . . . I think I moved from group to group, and the last group were talking about the telling of stories at parties and so on . . . Now, the actual words No, nothing . . . The last thing I remember is seeing this woman's yellow hat on the floor . . . Parts weren't particularly pleasant in this dream.

E. Parts weren't particularly pleasant? In what way?

R.H. I didn't like the people.

E. Can you describe the people - in sequence?

R.H. Well, there were waiters in white coats. I remember - yes, I'm sure we were younger because I remember a scene earlier. My brother and I were walking down a marble passage towards the kitchens in the place. We never got there, we turned back, and there was a strange, big building with long passages and long flights of stairs and lifts. I'd a strange feeling I'd dreamt about it before . . . There was a feeling of familiarity about it. I can't think of anywhere like it . . . and we went up, I think in a lift, to the room about which I've been telling you previously, with the long tables in it, and the feeling I got was the feeling I used to get as a child . . . but sort of . . . of likes and dislikes and the people looked bigger . . . Now, as to the people . .

E. You can't remember any more conversations, or contents of them?

R.H. . . No . . . Oh, yes, yes, indeed. Biscuits. My mother was talking about some other woman, whom I knew but I can't remember now, about biscuits. How she liked biscuits and she always had biscuits in the house, and there were no biscuits

there Yes, she said - I remember her saying that she always had two boxes of biscuits . . .

E. Mmmhmm.

R.H. . . . My brother and I were behaving badly. We were tearing up and down the tables, and round tables. . . There's more to what people said . . . (very long pause) . . . No, there's very little else, it seems to have gone.

E. The woman your mother was talking to, did you recognise her?

R.H. They were talking about three women, in particular the one with biscuits. Yes, I recognised her but I can't remember who she was now . . . Oh, yes, my mother came over there to the table with one of the women and then she was introduced to the other two. I remember this woman. I think about two of them I knew but I can't remember them now. One I didn't. I think one of them might be Mrs. Cossor, and there were a whole lot of other people in the room, lots of whom I didn't know at all, and several I didn't like . . .

E. Mmmhmm. Right. And the last thing you remember, you say, is the yellow hat?

R.H. Yes.

E. This just stands out without fitting in anywhere?

R.H. No, I was merely talking about biscuits or something, and I looked at the floor - I think because I was smaller and the floor was nearer me - and there was a yellow hat.

E. How many groups do you think you moved to?

R.H. . . Well . . . I can't remember the other groups very well. They weren't big groups and most of them had men . . about two or three . . .

E. Anything else you can remember?

R.H. . . Well, there were white table cloths on the tables . . .

SUBJECT E.S.

FIRST NIGHT.

- 4.41 a.m. Onset of REM period.
4.42 a.m. PETER 6 times.
4.45 a.m. Awakened by high frequency tone.

Transcription No. 73.

E. Have you just been dreaming?

E.S. I didn't think I was asleep.

E. You didn't?

E.S. No. I must have been. I was dreaming about the dentist, now I think of it, and . . I was just looking at a form, I think, and making out the treatment that I was about to have.

E. Sorry - I didn't catch that.

E.S. I had just been looking at a form, making out the treatment I was to have, and I discovered that I was to have a tooth out, but I wasn't particularly worried . . . I can't connect that on to any beginning or anything . . . only, you know, the whole sequence. I don't know why I should be at the dentist, in what context I can't tell you actually whether the form was in colour or black and white. I imagine colour . . . And again, conversation must have been entailed.

E. But you can't remember it?

E.S. No. I don't think it was so much conversation as, you know, sort of . . I can remember in fact very little apart from going to the dentist and seeing the form making out the treatment.

E. Mmmhmm. Can you say what was on the form?

E.S. I saw something . . just . . one box, more or less, on the form . . I can't remember the actual wording . . The heading . . . it was signifying the teeth that were to come out, and I'm sure that 'dental caries' was written, or something - I couldn't tell you the actual words It was written in a . . . not a backward handwriting but it wasn't entirely copperplate, just - fairly neat.

E. Mmmmmhmm?

E.S. But I don't remember seeing a waiting room or anything like that.

E. What was the last thing you remember?

E.S. Really, looking at that form.

E. You said you didn't think you were asleep then?

E.S. No, I thought that - I don't know why, but then I realised I must have been.

E. You don't think that you were thinking - I mean, just then?

E.S. No . . . I think perhaps . . . Well, I probably seemed to take a while to get asleep or something after I woke last time, and maybe that (inaudible) subconsciously, you know.

E. There's nothing more you can remember of the dream?

E.S. No, I'm sorry.

- 6.10 a.m. Onset of REM period.
6.18 a.m. KENNY 6 times.
6.20 a.m. Awakened by high frequency tone.

Transcription No. 74.

E. Have you just been dreaming.

E.S. Mmmhmm. This time I remember a bit more . . . I can't think of the actual context but I was . . I must have lived in some village or something . . in mediaeval times, or something, more or less . . . A girl friend and I, I think, were sitting discussing two of the boys that were around . . I think one of the boys was higher up socially than the other and I was more or less in the process of explaining why they got on well . . . I think . . . I heard someone . . . Well, I was explaining to somebody, but I don't know who. I have no recollection of seeing whoever they were while this was going on, or anything like that. . . . I remember . . . just, we were having this conversation . . . I remember (inaudible)

E. Sorry, I didn't hear that.

E.S. I remember me speaking, although it's more from - not so much as hearing the result as uttering, if you see what I mean, my mouth moving or I don't remember anybody else, but again I don't remember speaking to anybody specific . . .

E. Mmmhmm. Can you remember anything you said?

E.S. No, I'm afraid not. I think one of the two boys involved was called 'Joe', but . . . I can't remember anything except that I was just - I think I was just explaining how they were getting on so well despite their difference in class

. . . . I think I was sitting on a table of some sort . . .
but . . . nothing more.

E. Mmmhmm. You can't remember anything the person you were
with said?

E.S. No, I can't remember any specific person.

E. Mmmhmm. You think it was a girl?

E.S. Yes, there was a girl, but I can't remember whether I was
speaking to her or somebody else.

E. Mmmhmm. These boys - did you know them?

E.S. No. They were just two entities, more or less. They were
not people that I know now. Neither was the girl. I don't
know who they were, and I can't visualise what they looked
like.

E. Mmmhmm. You thought one of them was called 'Joe'?

E.S. Yes, but it doesn't mean anything.

E. You don't know what the other one was called?

E.S. No.

E. Mmmhmm. Was it in colour?

E.S. I can't remember seeing anything very much at all so that the
visual aspect seems to have less than (inaudible) I
think I must have imagined - dreamt that I imagined - that,
well, one of the boys had bushy eyebrows, the farm-yokel type,
and I think they - the eyebrows were black, which seems there
must have been a certain amount of colour - so far as I can
remember.

E. You remember these eyebrows?

E.S. Well, not so much I remembered as remembered imagining, if
you follow. You do see bushy eyebrows.

E. That's all you can remember, then?

E.S. Yes, I'm afraid so.

- 7.35 a.m. Onset of REM period.
7.42 a.m. JOHN 15 times.
7.46 a.m. Awakened by high frequency tone.

Transcription No. 75.

E. Have you been dreaming?

E.S. Yes

E. Have you any idea what it was?

E.S. . . . It's funny. I've not been awake, have I? Not since you last woke me up?

E. No.

E.S. Well, I dreamt I had already woken up . . . I met some friends of yours . . . what was it? . . . we were wandering around outside here.

E. Pardon?

E.S. We were wandering around outside here, more or less . . . I think . . although I was more just a spectator, I think . . . and somehow they were all going swimming, and the two friends were an engaged couple and they had a quarrel and they broke it up . . . and it was then I woke up, I think. . . . You sort of merged into the background with them and they were discussing whether they should get married or not because they kept quarrelling with a (inaudible) .

E. I see. Can you remember any things they said?

E.S. Well, I don't know who was saying, but somebody kept saying, 'John' with a very soft voice, and this seemed to be like an echo in the distance. It was quite mysterious. I remember her saying, "It doesn't seem right because every time we meet you just (inaudible) ". I don't know, words to the effect that "It's not like other people because so-and-so",

and I can't remember who so-and-so was because it was nobody I knew. And I remember she looked a bit like . . I don't know, just a combination of several people that I know. I can't remember what he looked like.

E. Do you know the name?

E.S. I think he must have been called John.

E. Oh, I see, Yes. And you heard this, did you?

E.S. Yes. She spoke more. He didn't speak much.

E. Yes. You were saying something about this voice - ?

E.S. Yes, well, it was just in the background . . hearing 'John'.

E. It was her?

E.S. I don't know. There was a female voice, but I don't think it was her, it was going on while she was speaking. . more like, I don't know . . A Barry scene in 'Mary Rose' . . an echo in the background . . . I think you must have spoken actually . . earlier on . . because I think (inaudible)

E. I see.

E.S. And I was still here, strapped up to everything . . . and you came in.

E. I see. You thought you might have been awake?

E.S. . . I had woken up and these two folk had appeared (inaudible) psychology (inaudible) . . somewhere remote . . . I don't know, somehow they came in here and chatted . . They were going swimming and you were going swimming too . . I don't know where I was . . . I don't remember getting up or anything like that, but I sort of floated downstairs . . .

E. Was it in colour?

E.S. I think so. All I can remember is her face. It must have been in colour because I think I discovered (inaudible)

something and (inaudible) were in colour.

E. Uhha. Anything else?

E.S. I don't think so.

SECOND NIGHT.

3.21 a.m. Onset of REM period.

3.31 a.m. PETER 8 times.

3.33 a.m. Awakened by high frequency tone.

Transcription No. 76.

E. Have you been dreaming?

E.S. . . . Mmm . . . I don't think I have, really . . I remember sort of becoming more conscious of . . . the fact that I was meant to be dreaming, more than anything. I heard a voice saying 'D.J.' at various intervals, which I presume sounds like I must have been dreaming. I'll try and sort something out I'm sorry, I can't remember anything specifically.

E. Well, I mean, I think you try too much to give a coherent dream, you know. If you could sort of tell me the fragments, anything you can think of - ?

E.S. I can't even think of anything, or I would have told you.

E. Well, you see, you mentioned something about being more aware of being awake, and this voice.

E.S. Yes, that's the only impression I had.. . I still have . . of any mental activity.

E. Oh, I see . . . Could you - when you had this impression of being more awake and that something to do with the dream -

how do you mean, actually? That you were thinking this, or - ?

E.S. Yes, I think that I had been thinking that I ought to be dreaming, but it's . . . not consciously . . . it was just an awareness that I ought to be dreaming, and I don't know where this voice came from It was just a sort of rhythm similar to the rhythm that was in one of the times - last time I heard the voice. It was the same voice.

E. Pardon?

E.S. It was the same voice, very similar in intonation and so on, but I can't remember what it was.

E. It was the same voice?

E.S. Yes, it was just the same record, rhythmically playing 'D.J.', slightly haunting.

E. Uhha. It was a voice - a what?

E.S. It was a female voice?

E. When you say this was a rhythm, what sort of rhythm?

E.S. Well, just at rhythmic intervals.

E. Uhha. Can you - ?

E.S. Sort of 'D J, D J, D J' - sort of like that. I can't remember anything that was going on in the foreground while that was going on in the background.

E. This didn't seem to have any relation to - ?

E.S. No, it didn't seem to have any relation to anything.

E. Did you think - this voice - I mean, at the time, was this voice the same as the one which you seem to have heard in your last dream?

E.S. Yes, it just seemed exactly similar.

- E. Did it seem so when you were dreaming it, or does it seem so now?
- E.S. No, I think it seemed the same.
- E. It's nobody you know?
- E.S. No. It could be somebody, but it would be a haunting slant of it. You know, in mists go, I suppose, and makes it different. It doesn't seem to be anybody I know.
- E. Mmmhmm. Who was this - would this person be?
- E.S. No, I don't think it is anybody I know.
- E. Oh, you said it could be. You don't mean anyone in particular?
- E.S. No, no one in particular. I mean, it sounded just quite similar to my own voice when you were asking what the rhythm sounded like.
- E. You don't think it was your own voice, then? You weren't hearing your own voice out loud, or anything?
- E.S. Well, I don't see how it It seems very odd that thoughts could be like that It could be, I suppose I can't remember anything else.
- E. And you thought it was something outside yourself?
- E.S. Oh, yes, yes. Definitely. I didn't feel I was mouthing the words I heard
- E. That's all you can remember?
- E.S. Yes.

4.49 a.m. Onset of REM period.

5.00 a.m. CHRIS 7 times.

5.02 a.m. Awakened by high frequency tone.

Transcription No. 77.

E. Have you just been dreaming?

E.S. Yes. I was going to get the bus somewhere.

E. You were going to get the bus, did you say?

E.S. Yes. I'm not certain where to . . . again I heard a voice. I think it was saying 'Yes' . . . this time again with a rhythm in it as a background.

E. That's interesting.

E.S. I don't know where I was getting the bus either . . There was some other girl involved . . . and she . . and we were meeting for some reason at some pre-arranged time . . . I don't exactly know what, and I had just been debating whether to get the bus or not . . . I don't really know what else I can remember I think the girl was perhaps called Joyce . . . but actually the features - I don't remember very much in the way of anything visual . . I don't know it didn't link with anybody.

E. Pardon?

E.S. The girl didn't seem to be anybody I knew . . . I don't think I can remember anything else.

E. You say you heard this voice again?

E.S. It wasn't so clear this time. I think it said 'yes'.

E. This was the same voice again?

E.S. I think so, but it was fuzzier. It was still a female voice.

E. How many times did it say it?

E.S. I couldn't tell you. It has just been saying the word at

fairly even intervals right up to the time you woke me. I don't know how often . . .

E. Mmmhmm. And this wasn't the girl in the dream? It was somebody - ?

E.S. Oh, no, it's always a background.

E. Mmmhmm. You're not sure whether it was the same voice but it was similar?

E.S. I think it was the same voice, but it wasn't so clear-cut. More background than before.

E. Mmmhmm. Was the dream in colour?

E.S. Well, there was less vision entailed again. It was more just (inaudible) Even this other girl - I can remember it was more of a presence than an actual person.

E. Can you remember anything you said, or she said?

E.S. Not specifically. I think I probably said words to the effect that 'I'll get the bus and see you there because otherwise I may not have time to walk'

E. Mmmhmm. How long do you think this all took?

E.S. It seems a very short instant, actually . . . I mean, if it had been going for a while it would obviously . . .

E. Yes, but how long do you think?

E.S. Oh, it was a very short time . . under . . just a minute or two, something like that because I only remember that fragment. I mean, it obviously must follow on from a little else.

E. Mmmhmm. Good.

- 6.39 a.m. Onset of REM period.
6.52 a.m. Passing motor car outside.
6.54 a.m. CHRIS 10 times.
6.56 a.m. Awakened by high frequency tone.

Transcription No. 78.

- E. Have you just been dreaming?
- E.S. Mmmmm . . About . . cars, yes, cars, mainly. A friend of mine came in - you'll maybe know him actually, Kenny Macdonald, he's something in Psychology.
- E. Who?
- E.S. Ken Macdonald.
- E. Ken Macdonald? Mmmmm. No, I don't actually.
- E.S. It was mainly . . . we were discussing . . I think his car had just broken down and he had done something to it anyway, you know, to . . we arrived at some house . . and he went away . . . Oh, the house belonged to a friend of Kenny, my boy friend, and Ken Macdonald went away and the owner of the house came back and he was just getting his car into his own drive, you know, and Ken Macdonald had just gone inside, and then
- E. Sorry, I didn't catch that.
- E.S. I think they had just missed each other, the house owner coming up as the other went away.
- E. Yes?
- E.S. And then I talked with the house owner for quite a while.
- E. The house owner?
- E.S. Yes, but he wasn't anybody I know. And we discussed bits about cars, I think, with Ken Macdonald, though I don't

remember seeing Ken Macdonald . . . and other bits and pieces. I had the impression it was Ken but I don't remember his voice either . . . and it wasn't his car.

E. Sorry, I didn't catch that either.

E.S. It wasn't his car either. I don't know why I thought it was him at all . . . but I don't remember any specific bits of conversation. Whoever it was whose drive we were in looking at the car engine was discussing with Ken Macdonald, if it was him, the car having been out all night and not put in the garage, but . . . it was all so . . . Although there was some other boy there as well, but I don't know if I knew him . . . I think the boys were going - I think he must have belonged to the firm that Kenny, my boy friend, is in, and it was in the lunch hour, and they were all going back to work . . . but . . . the house owner worked in this firm as well . . . I think that's all.

E. What was the last thing you remember?

E.S. I think I was talking to the owner of the house . . . we were outside in the garden all the time, and he was talking . . . about the fact that there were the two boys and me, something like that . . . and I was saying that was all right. We were having a discussion whether I would be happier if there were two boys or three, something to that effect, anyway,

E. Can you remember any other - ?

E.S. I remember this discussion of that. I don't remember actually any kinaesthetic feeling of arriving in the car, which was an old one, you know . . . stopped suddenly . . . I don't remember anything else at all. Although I remember - well, I must have been in one car anyway when - I reversed

into this driveway in one car. I remember feeling that - not so much in the (inaudible) just an impression of reversing and looking at the trees and the grass as we passed them.

E. Mmmhmm. I'm not absolutely clear on the sequence. First you were with, you saw, this Ken Macdonald, who is not the same as Kenny, your boy friend?

E.S. No.

E. And then, the next thing was - ?

E.S. Well, I think I came to this house in Ken Macdonald's car -

E. Sorry. You came to this house in his car - ?

E.S. Yes. And this person had a look at the engine because he was quite (inaudible) .

E. Yes. And then - I'm not quite sure where your boy - ?

E.S. No, he didn't come into it at all.

E. Oh, I see.

E.S. And then, the - whoever the house belonged to, arrived with his car, and Ken Macdonald just took his out of the way in time to let the other chap get his in. And I don't know what became of Ken Macdonald then. I just talked to the fellow who owned the house.

E. I see. There seems - there is some connection between the house, the owner of the house, and your boy friend?

E.S. Yes, well, I think to begin with, the house - I can't - I don't know him. I got the impression he was in the same firm and that he was just going back after lunch.

E. I see. Fine. The last thing you remember is still talking about cars?

E.S. Yes.

E. Good. Was it in colour?

E.S. Yes. Well . . yes, I think it was. I remember - I think the house owner was a bit in colour because I think he had quite a pink complexion. I remember the car being a sort of grey-green.

E. Uhha. You didn't have any background voices?

E.S. No.

E. Good. Anything else?

E.S. No. I think that was all.

THIRD NIGHT.

1.42 a.m. Onset of REM period.

1.48 a.m. JOHN 5 times.

1.50 a.m. Awakened by high frequency tone.

Transcription No. 79.

E. Have you just been dreaming?

E.S. . . Yes . . Conversation was entailed. . . I think about people's ability to pay for something.

E. Sorry. I didn't catch that.

E.S. I think about - I was talking to somebody else but I don't know who - about people's ability to pay for something, which could be a carry on from my Pol. Econ. theory.

E. A carry on of what?

E.S. From Political Economy, which I'm doing. And I've a feeling that just before I woke I heard again just once, very vaguely, a voice or something. I don't know.

E. Uhha. . . . What - this same voice?

- E.S. Yes, more like . . sort of . . I don't know. I suppose it sounds like a man's voice, but again I don't know.
- E. Do you know what it was saying?
- E.S. I think it said 'John', but it was very, very distant . . and I felt, gosh, I've hardly been sleeping, I've just imagined the whole thing . . . I'm afraid there's nothing . . I can't remember very much else. . . I think . . I have a feeling I might have been sleeping more restlessly than usual.
- E. . . So you were talking - do you know which sex this person was?
- E.S. . . . No . . No, I don't know.
- E. You were talking about this theory in Political Economy?
- E.S. Yes.
- E. You don't know where it took place?
- E.S. No . . I was talking of people's ability to pay, but it wasn't so much in connection with Pol. Econ. as something specific, but I don't know what that specific thing was . . I can't remember any - where I was speaking, or anything like that.
- E. Mmmhmm. Do you have any vision of anything at all?
- E.S. No . . . I just have an impression that I was speaking to somebody else . . . And I would say perhaps that it's a 51 chance to 49 that it was a female voice, not a young female - but I couldn't go any further than that.
- E. Mmmhmm. Nothing else?
- E.S. I'm sorry.
- E. Mmmhmm. . . . This voice again - ?
- E.S. It was just once I heard it. It was just like a distant echo.

E. You think it might have been your own, then?

E.S. . . . Well, yes . . if my own, not in a tone that I generally use. It was a very remote, haunting tone, but I know . . well . . not so much in this case as in the other cases, where I said it had been saying - it sounded pretty similar, you know, on the same lines, but this was very distant and vague . . but I think it was the same.

E. Mmmhmm. I suppose it's no use asking if it was in colour?

E.S. No.

4.47 a.m. Onset of REM period.

5.00 a.m. KENNY 8 times.

5.03 a.m. Awakened by high frequency tone.

Transcription No. 80.

E. Have you just been dreaming?

E.S. . . . I've been doing a sort of quiz - a word quiz.

E. You've been doing - ?

E.S. A word quiz. I was doing it at school or something . . I'm just trying to remember the word . . . I think it was . . . synonyms probably . . The words are just on the tip of my tongue. They may come back to me . . and . . I can't remember any specific other people involved although I think I wasn't alone.

E. You were what?

E.S. I can't remember any other specific people, but I wasn't alone.

E. Oh, you weren't alone? Sorry. Yes?

E.S. I don't think . . necessarily . . .

E. These words, can you remember any?

E.S. I was in the middle of debating some point about the words, but I can't remember . . . I can't remember at the moment.

They may come back to me because I think they were nearly -

E. They were what?

E.S. Nearly being exclusive. I think I would have been able to see them if I had said them quicker . . . I saw this type-written sheet in front of me, with the two that I remember doing more recently, in horizontal lines, but I don't . . the sheet was in white but I don't remember what colour the printing was, just the usual black and grey.

E. Mmmmmhmm. How many of these words were there?

E.S. Oh, something like an hundred. This is about the middle of the sheet . . were written in (inaudible)

E. Mmmmmhmm. And you had to provide the synonym?

E.S. I think it was the synonym. If I could remember these two - I would have told you definitely . . . I think so because the dictionary was involved and I had been consulting the dictionary . . . I don't remember anything specific . . . just the impression that the dictionary was involved, and I don't know what context this quiz was, in front of me

E. You can't remember your - did you reply to these words, or did you write them down?

E.S. I don't remember writing them down, no.

E. You don't in fact remember answering them?

E.S. No . . Well, I just, these two - I think the first began with 'A'. I'm more likely to remember that because I did say to somebody, "Oh, you know what that means", or something,

and it obviously must be something - I think it was something that cropped up recently in some context or other, but I think it's gone I don't think, well, once an answer was settled mentally, I think it was just, you know - the next word was this

E. I see. I'll just switch off the tape now and you can -

E.S. (Long pause) . I think they were abstract-type words.

E. Abstract-type words, like . . for instance . . ?

E.S. Well, I don't know. It was - 'abscissa' springs to mind, but it wasn't 'abscissa' If it comes back

E. You think one of them began with 'A'?

E.S. Yes.

E. Began with 'A'?

E.S. Yes but I don't think I'd

E. You think you might make it up?

E.S. Yes. I keep going through these things, like 'aggregate', 'autonomy' and so on, . . Oh, I don't feel that one is going to ring any bell.

E. You don't? When you think of all those words, you don't - ?

E.S. I don't think they were

E. You don't think they were the ones?

E.S. No, but I don't think that by thinking any more they will come back.

7.14 a.m. Onset of REM period.

7.23 a.m. KENNY 13 times.

7.26 a.m. Awakened by high frequency tone.

(A wheelbarrow was being trundled outside almost continuously for the last 3 minutes prior to awakening).

Transcription No. 81.

E. Have you just been dreaming?

E.S. . . . Yes . . . I was at a concert . . some Scots character was - I think he was mainly a comedian, and with a fine voice, was performing in - oh, somewhere at the Gateway, and it was something very unusual, the first time that this actually had happened -

E. Sorry. I can't hear for that wretched barrow.

E.S. It was the first time he had performed to this audience, to that audience or something, for some reason or other, and he was - the scenery was some rock with a crack in it and he'd been telling some story about this crack in the rock. He was standing sort of in front of it and was saying how long it had been going to fall, and I think he walked off the stage and, as he was doing so, another crack appeared in the rock and it fell on top of him I can't remember exactly what he looked like. I remember the rock -

E. You remember what?

E.S. I remember the rock, which was . . the scenery, which was a dark grey. Perhaps it was a tree sprouting forth. I don't remember whereabouts I was standing, or who I was with, or whether I was just spectating from a different point of view.

E. Uhha. What was the last thing, then, that happened in the dream?

E.S. Well, the rock fell down on top of him as he was leaving the stage.

E. I see. Can you remember anything he said?

E.S. No, I don't think I was speaking this time. I think I was just -

E. Anything he said?

E.S. Oh, anything he said. . . Not specifically . . . I remember him pointing to the crack and I think he was relating tales of his childhood, and saying he thought the crack would bring the rock down some time but, just look, there it was - something like that, and next minute it wasn't, it was on top of him.

E. There's nothing else?

E.S. No.

E. And you say you thought it was in colour?

E.S. Yes.

E. Mmmhmm.

E.S. And I still didn't remember the word from the last . . .

E. Oh, I see.

E.S. I don't think there was music. I think there was his voice and probably the noise of the rock falling, but no music . . .

E. Mmmhmm. Good.

FOURTH NIGHT.

2.44 a.m. Onset of REM period.

2.53 a.m. CHRIS 4 times.

2.55 a.m. Awakened by high frequency tone.

Transcription No. 82.

E. Have you just been dreaming?

E.S. Mmmm. Just about . . . oh, heavens, an absolute hotch-potch of things.

E. Uhha.

E.S. . . . The last thing that went through my mind was that changes in the estimates of . . . some, . . . well, just everything in general. You know, 'don't stick to the old routine all the time' sort of idea . . . I don't know . . . the context exactly . . . I dreamt that I was - I had already dreamt and you hadn't woken me and I was awake myself . . . but what I dreamt then . . . I don't know

E. Anything else?

E.S. . . . There was something connected with sex in some way . . . I don't know . . . some sexual pervert, but I don't remember any more . . . where a discussion was going on about whatever was wrong . . . and . . . but no . . . I think it's only the different fleeting ideas that . . . there are no specific . . . I can't remember very much vividly, just various people, nobody special.

E. Who was this discussion with?

E.S. I don't know . . . I mean, I just remember that I did dream something concerned with sexual perversion in some way

E. You think there was a discussion, then?

E.S. I think so.

E. Do you remember how many other people there were? Were you discussing it, or were they?

E.S. Oh, I think I was discussing it, but not getting down analytically to discussing it . . . just commenting more. . .

E. Uhha. Did you know to whom - ?

E.S. I was discussing? No.

E. Do you know whether it was a man or a woman?

E.S. No. I don't think it was anyone of any special authority or knowledge . . . I don't know who the people were
(inaudible) obviously about them, more . . . I think there were two people . . . I don't know . . I think they were around . . . I'm not sure . . . I don't remember much more.

E. Those were the three things, then?

E.S. I think so. I've lost track of what they were now. I'm trying to think what was the last thing when I was woken up.

E. Change . . . You said something about sacks, did you?

E.S. Beg pardon?

E. Sacks. Did you?

E.S. No.

E. Oh, just sex. All right then. Which order? The last thing you think was change?

E.S. Yes.

E. What about . . ?

E.S. I'm not very certain. . . . the sex first, but I'm not very certain at all . . . And I don't think it followed on directly or I would probably . . . there was probably something in between, but . . . I don't know what I feel as if there had been a lot, you know, of various odd things going

through my mind, but I can't remember any more back, enough to describe.

E. So you can't remember any visual images at all?

E.S. No. Well, just very vague impressions, more, how many people were there or something like that, that's all.

E. Were you - you were asleep when I woke you, were you?

E.S. Well, I did say that I thought I had been awake.

E. Oh, I see. You thought you were awake when I woke you?

E.S. I thought I had been awake.

E. I see. Yes.

E.S. I don't know - I was convinced before you woke me - I was convinced that I had dreamt and had woken up myself and that you hadn't, you know, come through on the speaker, and I was just going to sleep again. But whether this was in fact, I don't know.

E. Mmmmmhmm. But you say you think you were asleep when I woke you.

E.S. Just immediately before you woke me. I was asleep when whatever change we were talking about

E. Mmmhmm. Good. Fine.

4.13 a.m. Onset of REM period.

4.21 a.m. PETER 15 times.

4.24 a.m. Awakened by high frequency tone.

Transcription No. 83.

E. Have you been dreaming?

E.S. Yes . . . about an Orphan Society . . . I was actually in

the - I think it was where they had school. It wasn't so much the actual home where the orphans worked, where they had school, and they weren't having lessons while I was there speaking to them, and, well, it was about five stories up from the ground, and a lot of people were sort of leaning out of the window looking down because they had come from the various slums and tenements around, and I got the impression that they were sort of looking back on old times I remember speaking to one little one in particular, who had quite a lot of dirt behind his ear, and also I remember colour, because they had football jerseys, as boys do, in green and black . . . and I . . . there was something else just before I woke up, I think, though still on the same theme

E. Can you remember what that was?

E.S. I don't think . . it may have been a continuation of the theme that . . well, you know They had been living in the same neighbourhood and now they were living under, I suppose it was the same Local Authority care, and occasionally they still looked back on old times, when they were free to do more what they wanted. I remember I had broken up - one or two of them had been fighting on the floor. There weren't any - oh, yes, there were girls, but these were boys who had been fighting. Nothing very fast and furious . . . but they were only about eight years old or so . . and there were girls, but I don't remember seeing them so much, or what they were wearing, but just the fact that they couldn't - that they had misbehaved or something and had been stopped from going to the Guides, Girl Guides

meeting or something like that. There were girls there but I don't remember what they were wearing, but most of them were wearing these polo-necked jerseys in bottle-green.

E. Mmmhmm. Can you remember what - any other conversation, things you said, or they said?

E.S. . . . Well, I remember talking with one - it must have been a girl - about not going to Guides any more, and a friend beside her - she'd said she missed them but the friend beside her said she didn't because they were rotten.

E. She what?

E.S. She didn't miss it because they weren't very good, and besides there wasn't any fun entailed, and the children had a fight This is the thing (inaudible) also placed in a room quite high up, about three or four or five stories, looking out over Edinburgh in general - or any city, of course, but presumably Edinburgh . . . the setting was quite like some of the psychology - the psychology library, or something . . . nothing very startling . . . There wasn't any other adult there, I remember that much. . .

E. What's the last thing you remember?

E.S. . . . Well, the last thing I clearly remember was pulling this little boy from the window, watching him in case he fell - fell out. He was quietly looking down. I remember noticing that he had dirt behind his ears and also thinking vaguely, 'I wonder if that's really there or if it was put in for the film'.

E. For the film?

E.S. Yes, so it must have crossed my mind that . . . there was some film or something going on and that, you know, we were characters in the film.

E. Mmmhmm?

E.S. I think I'd been and gone on speaking to him but I don't know what I said after that

E. Mmmhmm. Good. There's nothing more?

E.S. No.

E. Oh, there's one point. Can you remember the names of any of these kids?

E.S. No. I don't think names entered into it.

E. Names didn't come into it? Fine.

5.37 a.m. Onset of REM period.

5.48 a.m. JOHN 8 times.

5.49 a.m. Awakened by high frequency tone.

Transcription No. 84.

E. Have you just been dreaming?

E.S. . . Yes . . about having chops for tea . . . We were sitting at a table with a white table-cloth, and I was talking to three others . . . I think they were all girls, and I don't know why we all were sitting together, but we were having chops and they were for tea, and there was a white table-cloth on the table - that was, you know, there was colour involved . . . And somehow we had been discussing having chops with strawberry jam. I think that was the gist of the conversation. . . . Just before you woke me, one of them, the girls, said, "Oh, no, she won't have strawberry jam with hers. Her grandmother's like that. She's a funny wee soul. She likes that sort of thing". And I

said, "Oh, what?", and she said, "Oh, chops with strawberry jam".

E. Mmmhmm.

E.S. . . . I don't think there's very much else that's enlightening . . . We had just been sitting down to tea and all these friends were all eating as well . . . I don't remember anything else, I'm afraid, apart from the chops, perhaps fried potatoes, but nothing very much. . . . And I don't know who the other two were and I don't know who this was . . . and I don't know the raison d'etre, I don't know why we were there.

E. Mmmhmm. Did you say anything?

E.S. . . . Yes, . . . when we discussed the eating of chops with or without strawberry jam as an extra, I think it was me that put strawberry jam on my plate first, and I was saying stupid things like that.

E. Do you remember who these people were?

E.S. No.

E. But they were all girls?

E.S. Yes, I think so.

E. Mmmhmm. And you think it was in colour?

E.S. Well, it was in colour.

E. It was?

E.S. I saw the strawberry jam and the white table-cloth.

E. Uhha. Good. Anything else? How long do you think this dream took?

E.S. . . . It makes it very difficult, because all I can remember were fragments. It didn't seem as if it was any time at all.

E. I see. And that was just before you awakened?

E.S. Yes.

E. Mmmhmm. Good.

- 6.27 a.m. Onset of REM period.
6.35 a.m. KENNY 15 times.
6.37 a.m. Awakened by high frequency tone.

Transcription No. 85.

E. Have you just been dreaming?

E.S. Mmmmmmm. I was . . with the . . Yes, I was down at the Army . . I think one evening . . . and . . I'd just had a long involved discussion - Oh, no, I hadn't . . . Yes, at the end of the dream, I was down at the Army - I'm in the T.A. - and it was in that context - and I'd just gone up to the Officers' Mess and met this boy - I don't know, I hadn't gone into the room yet. Prior to that, I'd been back at school, or well, maybe not school, but back with the Headmistress and some of the girls, chatting in general . . . the girls were further below me and just - we were chatting, and one of them had been - she took a holiday job in a shop and this created quite a stir because she is usually quite a scatter-brain, and . . I don't know . . we were just sitting in the Headmistress's room talking about this for a while, and . . . now, I can't remember . . I know that the girl was somebody specific who, oh, was at school a long time ago . . . but I don't think any of the others were anybody specific. We were from the same school. . . . About the Army, I remember the faces of the people were known faces, of the other officers, although their manner, you know, their mannerisms were as if they should (inaudible) seemed to represent various people but didn't correspond in features to the people I know.

E. Mmmmmhmm?

- E.S. No conversation, really . . . Apart from the fact that I was late in going up to the Mess and as I was on my way upstairs various people said to me, "Oh, you're late. Do you know who's here?", and I said, "Yes" . . . I don't think there's very much more of interest.
- E. They said what? "You're late" or "Do you know" - are those the words they used?
- E.S. Well, "You know you're late" and also some important person was up there and did I know, but I can't remember who the important person was.
- E. Were those the words they actually used?
- E.S. Well, "You know you're late" . . . I think those were the words they used. And "Do you know that so-and-so is here". Yes, I think it was so-and-so . . . Colonel so-and-so, whatever the name was.
- E. Mmmhmm. Who - ?
- E.S. Colonel. Somebody quite high up in the hierarchy.
- E. Oh, yes . . . Mmmhmm. How many - this was one person said this, or several?
- E.S. Oh, no, there were some . . . outside, just, you know, at the door on the way in from the street, and then . . . oh, yes . . . on the way upstairs. That's right . . . there was a lot of people coming down, women officers, they didn't speak to me . . . and . . . oh, yes. . . there was a cupboard under the stair. Two of the . . . I think there were two women officers (I didn't know them) in there, and another one was sitting in the bath with all her clothes on.
- E. Sorry, I didn't catch that. One was sitting in the back?
- E.S. In the bath.
- E. In the bath?

E.S. Yes, in this little alcove, with clothes on, but I don't think they were in uniform . . . and I remember thinking, 'What on earth are they doing in there?' . . .

E. And they didn't say anything?

E.S. No. I think they were pretty involved. The other two were giving the one who was in the bath a bath.

E. I see. But she had clothes on?

E.S. Yes

E. And then you went on upstairs?

E.S. Yes, and I was still on my way upstairs when I woke up.

E. And how many people did you meet on the stairs?

E.S. Two coming down.

E. Mmmhmm. How many people, in fact, spoke to you?

E.S. Oh, they were in groups, really. I mean, there was a group outside that asked me whether I was late . . . and I think there was a doorman there, and perhaps . . oh, yes. there was an officer who was in the Unit at the time but wasn't actually the same facial . . well, the same features . . . I couldn't say it was so-and-so . . . it was more a mixture of . . . And there was also another person, he was in uniform, and there was somebody else in a lounge suit, but I don't know who he was either.

E. Mmmhmm.

E.S. So there were three there, but one spoke.

E. They were all men, were they?

E.S. Yes, they were all men. And inside, I met two women coming down stairs. They didn't speak at all

E. Mmmhmm.

E.S. But in the group, the school group, previous to the dream of the Army, we were all speaking

E. Uhha. Can you remember any specific conversation, any specific phrases, words, sentences - ?

E.S. Yes, well . . one - this girl that was going into - I think to work in a shop . . oh, yes . . she . . had been - the girls sitting next to me were saying that she had been, she had recited a poem on Children's Hour in the B.B.C., and she recited this poem, or bits of it, but I can't remember what it was. It was a bit of a hotch-potch of one or two children's poems that are very well known.

E. Can you remember any of it?

E.S. . . . No . . . It may have been an A.A. Milne poem, but I can't . . . it's like something else but I can't remember . . . Oh, yes, before that also, I had been - this is the same girl who was going to work in a shop - we'd gone to a shop. I think she'd met some of the people working in it, you know, behind the counter - she is a good bit younger than me - and I'd just gone with her. And I remember that to get to the shop we had to cross the canal which is just at the door (I don't know how we crossed it) and inside the shop we sort of wandered around. And it was in colour inside. I remember seeing jumpers, I think, and blouses on the stand, and looking at cards.

E. Mmmhmm?

E.S. I don't know what kind of cards they were. Perhaps they were supposed to be Valentine cards . . hearts on. I think that was the impression . . . and they were coloured. We just saw this shop and then we went to the Headmistress's office where there were quite a few others already. I think there were . . one . . three other girls, the

Headmistress, and then two made five.

E. Mmmhmm.

E.S. I think the others, they were all in school uniform, which is green. I don't know what I was wearing because I felt I had been away from school, but yet, it wasn't anything conspicuous. It could equally have been green.

E. Mmmhmm. You can't remember any poem or any other conversation or anything?

E.S. Oh, I . . . we all said (I think this was Margaret, the one that was going into the shop) was discussing when she used to be - she had changed a bit and we hoped, you know, we hoped she'd get on all right in the shop. I think that was the gist various people adding to it

E. Yes. And then the Army bit came? That was the last, was it?

E.S. Yes.

E. Mmmhmm. Anything else?

E.S. No.

SUBJECT K.J.

FIRST NIGHT.

2.54 a.m. Onset of REM period.

3.00 a.m. DIANA 12 times.

3.03 a.m. Awakened by high frequency tone.

Transcription No. 86.

E. Have you just been dreaming?

K.J. Yes, I have. Now, I have been dreaming - I can only - I can remember the A.A. coming into it (the Automobile Association) . . and a car. . . . I don't seem to recall very much more . . . Oh, yes . . two people . . I remember being booked for - not booked for anything, actually, just being stopped on a routine check by A.A. men standing on a lay-by on a piece of road I can visualise near Pitlochry, and both of us - a friend and I - were stopped in an indifferent vehicle - were stopped by an A.A. man on a routine check . . and . . I can't recall . . and there was a small loch on one side of the road, a steep hill with trees rising steeply, and a bright sunny day . . I can't actually recall . . .

E. Can you recall what he said, or . . ?

K.J. Oh, yes . . I said to him, "I've been stopped here before", and I don't recall him saying anything more to the effect than "Uhha", but he didn't actually say anything.

E. I see.

K.J. No, I don't remember anything more.

E. You can't remember anything more?

K.J. No, I can't.

- E. That's the last thing that you remember in the dream, is it?
- K.J. It is, yes.
- E. Uhha. Was it in colour?
- K.J. Yes, vivid colour.
- E. Mmmhmm. Good. Who was the other chap you were with, can you remember?
- K.J. Yes. A chap from the firm - who was at school with me - called Roger.
- E. Uhha. What was his name?
- K.J. Roger.
- E. Good. Nothing else?
- K.J. Nothing else that I can recall.

4.52 a.m. Onset of REM period.

4.59 a.m. EILEEN 15 times.

5.01 a.m. Awakened by final stimulus.

High frequency tone 25 seconds later.

Transcription No. 87.

- E. Have you just been dreaming?
- K.J. I can't recall anything at the moment. It may come back - it came back last time . . . I feel I have . . . I have . . .
- E. You can't remember anything at all?
- K.J. All that I can remember is . . . Apparently, just before you woke me - it may have been actually while you were waking me, I don't know - but just before you woke me I was conscious of - I thought that I shouted out or heard shouted out the word 'Eileen'. It was rather strange -

as though I had spoken it out outwardly, you know.

E. Mmmhmm.

K.J. That is . . . I can't remember . . .

E. You can't remember anything more?

K.J. No, I can't.

E. Were you awake when I woke you just now?

K.J. Well, I don't know . . you didn't wake . . I don't know if I was actually awake or not. I certainly haven't been lying awake.

E. No?

K.J. I have been sleeping all the time?

E. Yes.

K.J. And if I was awake, it would only be, I think, after you had initially stopped the whistling, whatever it was, or something like that.

E. Do you think you spoke these words. . er . . 'Eileen'?

K.J. I don't . . . this is it, I'm sure I didn't speak them, I'm sure I only thought I spoke them.

E. I see.

K.J. I don't think I spoke out, yet I have the impression that I had spoken out.

E. I see. That's all?

K.J. . . . I can't remember, and yet I'm sure that I was dreaming about something. And I also don't think it was anything to do with 'Eileen', but I don't know.

E. Mmmhmm. Well, that's O.K.

K.J. I'm sorry.

6.16 a.m. Onset of REM period.
6.27 a.m. EILEEN 13 times.
7.00 a.m. Awakened by high frequency tone.

Transcription No. 88.

E. Have you just been dreaming?

K.J. Yes, I have . . . What I can remember . . now . . I think we were in times of old.

E. Mmmmmhmm?

K.J. (Inaudible) rather a huge cavern - jagged rocks and the like which ships could sail into, or boats . . . and . . I was dressed in not modern-time clothes but more modern-type clothes - more or less peasant, I would say . . . and a ship of soldiers (inaudible) came in and landed . . . they landed . . and I was wearing a hat and I took my hat off and put it on again, but they were all very civil about it and nothing untoward. And then two people were standing at the water's edge and someone gave me a lump of coal and I threw it at them, and at the shock they both fell in.

E. Sorry. They both fell in?

K.J. I threw it at them - well, in the water, just beside them, and at the shock of this they both fell in. And that seemed to finish it. That seems to be the end of the dream apart from the fact that the people I was standing with all laughed, but that was all.

E. Mmmmmhmm.

K.J. I can remember this dream quite well - I can picture it all.

E. Did you say anything to these people, or did they say anything to you?

K.J. No, I don't remember any words being spoken. No, I don't

think a word was spoken . . . I can't remember any words.

E. Mmmhmm. What was the last visual image you had, then?

K.J. Myself and some other people who I can't - who I knew nothing about, standing laughing as a result of these other two people being thrown into the water - falling into the water.

E. Was it in colour?

K.J. Oh, yes. It was a fine day.

E. It was a fine day?

K.J. Although I still have the impression that it was in a cavern.

E. A cavern?

K.J. Yes, but it was all surrounded in rocks.

E. So the whole thing was really silent?

K.J. Oh, yes.

E. Good. That's all you can remember?

K.J. No, nothing else.

SECOND NIGHT.

3.30 a.m. Onset of REM period.

3.40 a.m. GILLIAN 14 times.

3.42 a.m. Awakened by high frequency tone.

Transcription No. 89.

E. Have you just been dreaming?

K.J. Oh . . yes . . yes, I have . . . Now . . something . . the words 'Test Report' are ringing in my head, so I'll just say that for the moment. I don't know why I've got these two words in my head now.

E. Which words?

K.J. 'Test Report' . I know I was dreaming the minute I became conscious. I was aware of something . . . don't know, my mind just seems to be a blank.

E. Well, just lie and think of it for a bit. It may come back.

K.J. . . . I don't remember very much. I was sitting at a . . line of very old-fashioned desks - sat and faced each other - and extend parallel places - placings parallel to one another . . . a length of eight people. Can you picture it?

E. Yes.

K.J. I'm sitting at the end of this and I was working at consumer research. And a 'phone was at my side and I don't remember it ringing . . . but in my head just seems to be ringing - figuratively ringing, the words 'Test Report'. That seems to be all I can recall. I can visualise this line of people working . . . old-fashioned desks, and I can still hear the words 'Test Report'.

E. That's just that word 'Test Report'?

K.J. Yes, this seems to be all. I'm sorry.

E. You don't know what you were doing consumer research in?

K.J. No, I don't.

E. How many people were there, roughly?

K.J. Oh, not a specific number. I get the impression something in the region of about seven, eight, nine - that sort of thing.

E. What were they doing - working at the desks?

K.J. Yes. I got the impression that they were . . that they were all working in the same vein - being consumer research. I (inaudible) 'Test Report' . I don't remember

answering a telephone or anything like that.

E. Mmmhmm. Was it in colour?

K.J. Yes, it was.

E. Anything more?

K.J. No, I'm sorry.

E. Were the other people - ?

K.J. It was a bright, sunny day.

E. Mmmhmm. Were the people in - both male and female or . . ?

K.J. Yes, they seemed to be both male and female. I can't picture one or another, but I have a definite impression of the other people being there.

E. You can't remember anything more?

K.J. No, I'm sorry.

4.40 a.m. Onset of REM period.

4.46 a.m. Awakened spontaneously.

4.47 a.m. B Stage (with REMs).

4.51 a.m. GILLIAN 3 times.

4.52 a.m. Awakened spontaneously.

High frequency tone, 30 seconds later.

Transcription No. 90.

E. Were you just dreaming now?

K.J. Yes. I was working . . now . . I was working somewhere else - I don't know what at the moment, and I met . . just when you . . just when I woke up, I met an old school pal and we were just exchanging greetings, more or less.

E. Just exchanging what?

K.J. Greetings. A chap I hadn't seen since school. Now, I met him standing in a queue inside the firm. I can only - it must have been at lunchtime. Sort of canteen-type queue. Now, what kind of firm was it? There was a woman in the front of the queue; although I feel there was an irrelevance there, I can't recall anything to do with her.

E. Can you remember the chap's name?

K.J. Oh, yes. Laurence Brown.

E. Can you remember what you said to each other?

K.J. I can just remember him looking at me more or less at the same time as I looked at him and both giving a rather amazed look, just as to say, "What on earth are you doing here?". I don't remember actually saying anything.

E. Can you remember him saying anything?

K.J. No, not actually speaking. . . . Don't think we did - just on the point of doing that and being woken up . . . Not very much.

E. That's all you can remember?

K.J. Yes.

E. Was it in colour?

K.J. Yes, it was. . . . And yet, I feel that there was a lot more. I have a definite feeling that I was dreaming about something to do with the firm and that this was the end of something, was the end of my experience in this place.

E. This was the thing that happened just before you woke up, was it?

K.J. Yes.

E. You did wake up, didn't you? Or did you?

K.J. Ah, well, did you give two whistles? Because I was lying awake and heard a whistle.

E. Yes.

K.J. Did you give one or two whistles?

E. Only one.

K.J. Ah, well, I was lying awake.

E. Yes.

K.J. I feel now that the chap that I met had a reason - not a reason but more of a reason to be employed in this firm because he's doing C.A. I don't know why, but I can only presume that it must have been something to do with figures. You know, either on the financial side of the firm, or something. But I feel that he had a reason, a logical reason, to have been there. Whereupon, although I was not an intruder, there was quite a look of surprise, as if to say, "Oh, you're doing engineering, what on earth are you doing here?". This is an impression, but a positive impression.

E. He's doing C.A., did you say? What's that?

K.J. Chartered Accountancy.

E. Uhha. And you inferred that this was what he was sort of thinking?

K.J. Yes. This is rather a positive impression . . you know . . that this wasn't my line, you know . . "what was I doing here". Not in any harsh way, but just in a curious way.

E. I see. You thought - you just inferred this by his look, did you?

K.J. Yes.

6.05 a.m. Onset of REM period.

6.11 a.m. NAOMI 11 times.

6.14 a.m. Awakened by high frequency tone.

Transcription No. 91.

E. Just been dreaming?

K.J. Yes . . . Now . . . we're travelling up north . . . having
an aim to ski.

E. Having what?

K.J. An aim to ski.

E. Mmmhmm?

K.J. At a weekend. And I'm going up with a friend, who says,
"Oh", and he's skied a lot and he'd be very pleased to take
me up. And I don't know who this friend is - and I was
going up with him in his car. and although I don't ski I
know all the skiing grounds . . but for all that, we were
going to . . in my mind, there's a small village called
Ardness. I don't think it exists, actually. About 18
miles south of Inverness - this is what I was picturing in
my mind. We went there - not any further south. Anyway,
we went there and we didn't go up the main road, we went
swinging away round. It's on two roads - you know where
I am?

E. Mmmhmm.

K.J. And came round a very long way to this village, to a
friend of this chap's, where we were going to stay.

E. Yes.

K.J. And another thing - another friend who was coming up the
short way and he couldn't understand why on earth we were
going round the long way.

E. Mmmmmhmm.

K.J. I can remember the name of the cottage. We were going to stay at Captain Glen's cottage - now, I don't know if that has any significance.

E. Where? Sorry -

K.J. Captain Glen's cottage I can't recall anything else.

E. You don't know who either of these chaps was?

K.J. No.

E. Can you remember any specific conversation?

K.J. Yes . . . We were sitting in this chap's car, at a particular road junction in Edinburgh, which I can remember - I don't know, do you want that?

E. Yes. Which one was it?

K.J. A road junction at the top of Leith Walk - difficult to explain, actually. There's a - I think there's a 'bog' or something in the middle of the road, just in front of the Theatre Royal - well, between this 'bog' and the "Deep Sea" Restaurant.

E. I know, yes.

K.J. And we were waiting to turn right down to York Place, and we were sitting there. And I expressed a wish and said, "Oh, I like that an awful lot and like skiing, but never managed to go up - or go up with anyone who knew the rudiments in order to show me". And the friend said, "Oh, there's no bother there. I don't know if I'll manage to go up this year, but", he said, "there may be a chance, not this weekend but next". These were more or less the words. And it was left at that. And I don't know how I knew we were going up. The next thing I recall is that we were going up.

- E. Mmmhmm. Can you remember your own words exactly?
- K.J. Well, I said to him that I was very keen to learn to ski.
- E. Well, suppose you say them as you actually -
- K.J. Ah, I don't know if I can . . . I don't know . . . I can only make a crack. I can't visualise my particular combinations of actual words.
- E. Well, make an attempt.
- K.J. Well, the attempt would be, "Well, so-and-so, I would very much like to ski, but I have been unable to find someone to teach me".
- E. Mmmhmm.
- K.J. These were my own words, as far as I can remember. I seemed to speak very little.
- E. I see. Can you remember anything else - any other conversation?
- K.J. No, I don't. No.
- E. Was the dream in colour?
- K.J. Yes, it was.
- E. What was the last thing you actually remember?
- K.J. The last thing I remember was visualising a map of the roads between Carrbridge and Inverness. And seeing this name 'Ardness', small village Ardness, on the map and seeing printed beside it 'Captain Glen's Cottage'. That's the last thing I remember seeing.
- E. What were the last things you were talking about, that you can remember?
- K.J. He said, "Do you mind, I'm going on to my friend's cottage to stay, not very far". And I remember - my impression after consulting the map was that it was quite a distance

away from where we were going. I can't remember where we were going to ski. I can only assume it was in the Cairngorms.

E. But you did actually meet this friend's friend?

K.J. Oh, yes. And went up, just the two of us.

E. Yes, but this was at Captain Glen's cottage?

K.J. Oh, we never got there in the dream.

E. I see. But you met him there, somehow? Or where did you meet him?

K.J. Oh, no, sorry. In Edinburgh, and I went up with him in the car.

E. Oh, I see, but you -

K.J. This friend who had a cottage was just driving there, you see.

E. Oh, I see. I thought you had actually met him.

K.J. No. We never got there in the dream.

E. Mmmhmm. I see. There's nothing else you can remember?

K.J. Not that I can remember.

THIRD NIGHT.

3.20 a.m. Onset of REM period.

3.25 a.m. NAOMI 16 times.

3.27 a.m. Awakened by high frequency tone.

Transcription No. 92.

E. Have you just been dreaming?

K.J. Ah, let me think Yes . . I don't remember it all - it will probably come back. What I remember is . . . it concerns Britain, Africa - as a whole - and somewhere else, another country. I can't associate any name to this other

country. And . . . there appears to be a war on, or something or other, and it seems to have stopped. I don't know whether for good or just temporarily. And one thing that we are short of is food - that is, Britain - food, and I ask the African government's permission to get some food. That sort of thing. And I envisage myself walking across an estuary with the tide right out - in other words, sands for a great distance - with the sun behind me, to the far shore where the other side of Africa - African states seem to be waiting . . . and I can visualise this walk across this dried-out estuary. That, I think, is more or less it. That's the gist of it.

E. When you say you were asking for food, whom were you asking it from?

K.J. From the African states, but I don't recall one particular person, or anything like that.

E. Do you think you were asking - you didn't actually recall directly asking?

K.J. Oh, no, I hadn't actually asked -

E. You had?

K.J. I hadn't actually asked.

E. Oh, you hadn't. I see.

K.J. It was my aim.

E. What was the last thing you remember, then. It was this estuary, was it?

K.J. Me walking across this estuary.

E. Mmmhmm. Was it in colour?

K.J. Yes, it was.

E. And there was no - you can't remember any conversation or meeting? Any specific people, or anything like that?

K.J. No, I don't. No.

E. Anything more.

K.J. No.

4.29 a.m. Onset of REM period.

4.38 a.m. DIANA 16 times.

4.40 a.m. Awakened by high frequency tone.

Transcription No. 93.

E. Have you just been dreaming?

K.J. Yes . . . I have the most positive feeling that there is something to remember, but I cannot remember what . . .

E. See if it comes back.

K.J. . . . (Long pause) . . . In the firm where I worked and I'm with someone whom I don't know. . and . . at least, I don't recall him now . . . and we're standing watching a new building - they're making a new building - a new building is being built.

E. Yes?

K.J. Just up from it is another new building. And the other person said, "How's the place heated?" and this bloke said, "Oh, from the boiler house". And then we wondered how he got the heat there. And then we looked around and saw overhead pipes that seemed to be very high up, abnormally high up - all painted silver. And they weren't wrapped with any - you know, steel pipes, they weren't wrapped with any wadding or anything to keep them warm, they were just open pipes - that we thought was very strange. We knew that

these were the heating pipes. And they went up into this first new building - but the one that was being built, they were fitting pipes from the boiler house to it, similar-type pipes. And just a little way from this there was a lorry. On the lorry, there were railway sleepers, wire mesh, rolls of it - rolls of wire mesh and . . . too, a trolley filled with linen. I don't know what kind of linen. Cloth and things, you know, new stuff, something like tablecloths. I don't know if that's what it was. And it was lying on the ground and where exactly it had come from . . . and then we saw this lorry and reckoned it must have been taken off the lorry . . . and on the lorry . . . now, what's on the lorry? Now, there's something else on, you know, in its place. I don't seem to recall what was on the lorry now.

E. Oh, well, never mind.

K.J. And then . . . I must have woken up

E. What was the last thing you remember, then - was what?

K.J. The last thing I remember, standing at a particular point leading out of the offices and looking at this lorry, which was now laden with these things I told you of.

E. You don't know what it was?

K.J. Oh, yes, I know - can imagine it being laden. It was all in one, you know - it wasn't a lot of bits of things. It was one thing and it must have been quite long, and I don't remember what it is . . . The colour of the lorry was red That seems to be all I can remember.

E. Was the only conversation that in which . . . about heating?

K.J. Yes.

E. You can't remember anything more?

K.J. No, that's all.

E. And you didn't know who these other people were?

K.J. No. One person, really.

E. Oh, it was just the one. And that was a male?

K.J. Yes.

E. Nothing more?

K.J. No.

5.44 a.m. Onset of REM period.

5.55 a.m. Lorry passing outside.

5.56 a.m. GILLIAN 18 times.

5.58 a.m. Awakened by high frequency tone.

Transcription No. 94.

E. Have you just been dreaming?

K.J. Oh, yes I'm parking up a road - I don't know where - a road with very large houses on either side and all well set back from the road. I don't know why I was going up this road, but I went up to one and rang the bell. And after a while a maid answered and I don't know what happened, but I went in and was shown into a very large room with very large - very ornate ceiling, very ornate walls . . cloth - linen - wallpaper on the walls, heavy carpets, old furniture, etc., and a middle-aged lady was sitting up in bed. But the room wasn't a bedroom, really. It was more a sort of drawingroom, but this bed happened to be there and she was sitting up in it. And I was shown in, and I don't

recall being introduced to anyone but exchanges were made - but there didn't seem very much said. I remarked what a wonderful house it was, what a marvellous room - the decor, etc., and then I was to have breakfast. I don't know why. But she rang for - this was the woman sitting up in bed - she rang for the maid and asked her to bring breakfast. So I sort of strutted around the room and when breakfast came I - now, it was a strange thing but I was wearing a dressing-gown, but I was going to take it off and I thought better of it because of the cold, and left it on. And I was wearing pyjamas, dressing-gown, and a scarf, and yet I had been outside . . . I don't quite follow. But I kept it on and sat down beside the bed.

E. Beside . . . ?

K.J. The bed. And the breakfast was brought in on to a table near the bed. And that seems to be where I woke up. It appears to stop there quite abruptly, in fact, I was still dreaming.

E. Uhha. Can you remember anything else you might have said, or can you remember anything she said - the old woman?

K.J. No, I don't, not in words at all. Something that seems strange - when I was sitting there, I seemed to be trying to think something about this woman and I seemed to . . . I can remember remembering as if it were that "Oh, yes, she came - this woman came from Chile".

E. From Chile?

K.J. Yes, and that . . . the only other thing I remember in that connection was - oh, yes, I can remember her running about in her bare feet on rocky ground. That's all I can remember.

But I remember both these things quite clearly.

E. I see. This was a thought you had about her, was it?

K.J. Yes, as if I was wondering, you know, something about her just by getting at her background.

E. I see. You don't know why you thought this?

K.J. Oh, I get the impression I - oh, why I thought it?

E. Yes, like you say you saw her running around, but not in the bedroom, obviously.

K.J. Oh, no. Oh, sorry, I beg your pardon. What I was meaning was - I was sitting trying to think something more about her and then I recalled, you know, that she had come from Chile in her young days. I knew that in her young days she had run about barefoot on rocky ground.

E. Mmmhmm.

K.J. I don't know why I thought those things at all.

E. Why - you seem to show great surprise over that, also the dressing-gown. Why is this? That you - ?

K.J. Well, it struck me as strange that I had obviously come from outside and I don't recall changing into a dressing-gown or anything, and I suddenly found myself wearing a dressing-gown. But I remember it quite distinctly.

E. But I mean, those thoughts you also find strange, do you?

K.J. Yes, only just from their almost irrelevant nature.

E. Uhha. What about the maid? You didn't know any of these people, did you?

K.J. No. The maid was probably about thirty.

E. She didn't have a name, did she?

K.J. No. Fair hair, about thirty.

E. Was it in colour?

K.J. Yes, it was. The maid didn't wear normal, dark, sombre sort of uniform. She wore something rather similar to a nurse's uniform.

E. Is there anything else you can remember?

K.J. No, I don't think so.

FOURTH NIGHT.

3.21 a.m. Onset of REM period.

3.22 a.m. Car passing outside.

3.29 a.m. EILEEN 18 times.

3.31 a.m. Awakened by high frequency tone.

Transcription No. 95.

E. Have you just been dreaming?

K.J. Yes . . . I remember having been with Eileen saying having something to take in . . . Now it will probably come back . . . having to go into town and take back a big lamp . . This is strange, I remember . . . I'm somewhere, I don't know where, and Eileen is somewhere else.

E. Yes.

K.J. We're both away from home although, I feel, not a great distance in miles. We're returning to Edinburgh and having to bring certain stuff with us . . One thing is this big lamp.

E. Mmmhmm. There's some more, is there?

K.J. By jove, yes, there is. I simply can't . . . I can't get hold of anything else.

E. I see. You were saying that you were in different places?

K.J. Yes.

E. But you were both returning to Edinburgh?

K.J. Yes.

E. Uhha. You don't know who had the lamp?

K.J. Eileen had the lamp.

E. She had the lamp?

K.J. Yes.

E. I see. But you didn't see her - or did you?

K.J. Oh, yes, I was with her.. We were discussing it - and then I was going to wherever I was and eventually coming back via this place.

E. Oh, I see.

K.J. Where Eileen was.

E. You had been in different places?

K.J. Yes.

E. You weren't, at the time of the dream?

K.J. No, that's correct.

E. How were you returning?

K.J. By car, but I don't know what kind of car.

E. Mmmhmm. And you were saying something, you said?

K.J. I don't know what - I don't recall actually saying something so much as conveying a message.

E. The message being conveyed to - ?

K.J. Eileen, about arrangements for transporting this lamp, amongst other things I can remember standing in a little square room

E. But nothing more?

K.J. And standing at the fireplace - instead of it being a square corner, the fireplace was cut over the corner and it was painted cream. And there was a pile of little cases beside it. I feel that there was quite a lot more, but I just can't get hold of it.

E. Did this occur before or after the bit about the lamp?

K.J. No, this was where the bit about the lamp was occurring.

E. I see.

K.J. Where the action took place, so to speak.

E. And did you actually see Eileen?

K.J. Yes, although I don't know what she was wearing.

E. She was in the same room, was she?

K.J. Yes.

E. Do you think the bit you can't remember came before or after?

K.J. Before.

E. Before?

K.J. Oh, sorry. I think that the bit I can't remember is subsequent to -

E. To that?

K.J. To that, yes.

E. I see. How much do you think there would be?

K.J. I have a feeling that there was not a great deal, but I have a feeling that it was a lamp plus several other things of which . . . I don't know . . . I have the feeling that I could describe them in greater detail but . . .

E. Mmmhmm. But you can't remember what they were?

K.J. I can't, no. I have the impression that some things like . . . I don't know . . . maybe a cake . . . but only very faintly.

E. Mmmhmm.

K.J. But the other things seemed to be rather odd. As well as the, you know, as well as the lamp. I mean, why should we be carrying a large lamp? It appears to be of the same nature.

E. Mmmhmm. How many other things were there, do you think?

K.J. I have the impression of two or three.

E. How long do you think - how much more was there, say, before I woke you? - do you think, as dreaming time, you know, the time you probably dreamt?

K.J. You mean, how long you think to take place?

E. Yes. The bit you can't remember between - I mean, how much more do you think there was?

K.J. Oh, I see. Is time in a dream, the time imagined passed in a dream, the same as time in reality?

E. Well, the time - yes, the time you think it ought to be, or you think it now.

K.J. Oh, I should think ten minutes to a quarter of an hour.

E. Ten minutes more - of events which you have forgotten after this bit about the room?

K.J. Yes The more I seem to think about it, the further it seems to go, when imagine it.

E. Does it? There seems to be a big gap in the dream, does there?

K.J. Yes.

E. Well, that's O.K. It was in colour, was it?

K.J. Yes.

E. There's nothing more?

K.J. No, I'm sorry.

- 6.18 a.m. Onset of REM period.
6.26 a.m. NAOMI 18 times.
6.28 a.m. Awakened by high frequency tone.

Transcription No. 96.

E. Have you just been dreaming?

K.J. Yes, about to sit a drawing examination and to my despair I hadn't fully realised it until pretty near the time, and hadn't equipped myself with formulae and stuff, and I also hadn't had instruments with me of any description. So I rushed out to try and buy the basic ones and then I went up to the firm to get my own ones.

E. Yes?

K.J. . . . I was standing - the examination was to be held in a place very close to the drawing instrument shop. But I knew that a message-boy from our firm was in it, so I ran in there and got hold of him - and I wasn't very popular because they were obviously using him for something. Anyway, I got him to drop into the firm and he did that, but I could see that he hated me for it. So he came back and dropped them into the examination hall. So then I sat the examination. I have no idea how I did, or anything like that.

E. You've no idea what?

K.J. How I fared in the exam.

E. I see.

K.J. I was just doing this business, of not being fully equipped. The other strange thing about it was that - this is strange, it doesn't make sense, but just before the examination, I knew it was an exam. and I thought it was a drawing exam.,

but then I found it to be an examination in mechanics laws. And I was very worried about not knowing the formula because I hadn't done the slightest piece of revision. But then it seems to have changed completely to not knowing anything about a drawing examination. I don't know . . . but it seems to have got a little bit muddled somewhere.

E. Uhha.

K.J. That was the basis of the dream.

E. Mmmhmm. What was the last thing you can remember happening in the dream?

K.J. Oh, this message-boy coming into the examination hall with drawing instruments.

E. Uhha. Did he saying anything?

K.J. Not that I can recall.

E. You went into this drawing shop just before then, did you?

K.J. Yes.

E. And he was in there with some other people?

K.J. Yes, with one of the drawing - with one of the assistants. Obviously a senior assistant because I went right up and spoke to the chap. the chap from our firm, and the other chap was very annoyed.

E. Uhha. Can you remember any conversation? What did you say?

K.J. I remember saying, "Oh, I'll be sitting right at the back of the hall".

E. Did he say anything?

K.J. He seemed to nod in agreement or understanding.

E. Mmmhmm. Was that the only - you can't remember any other conversation?

K.J. No, I don't remember any other conversation. I remember I

more or less shouted this out afterwards as he went away.

I don't remember any other conversation, no.

E. Sorry, he shouted - ?

K.J. He more or less shouted this after me as - I shouted this after him as he ran away.

E. Oh, I see, he ran away - as you ran away?

K.J. No, as he ran away to get these instruments for me.

E. Oh, I see. You shouted that you would be at the back of the hall.

K.J. Yes.

E. What instruments were they, actually, do you remember?

K.J. Just things like various set-squares, compasses and squares and things like that, and also a slide-rule.

E. Mmmmmmm. Was it in colour?

K.J. Yes, although not so positively in colour. I seem to remember that the instruments in the instrument shop to be more black-and-white, and yet I can distinctly remember some points of it being in colour.

E. Uhha. Good. Anything else?

K.J. No. It seems strange, this business of getting mixed up over the two exams. There's not really anything else.

E. So you first thought it was a mechanical - mechanics exam?

K.J. More of a mechanics exam.

E. You were worried about the formulae?

K.J. Yes.

E. And then you - when you got in - thought it was a drawing exam. and that you were worried about not being able to draw, is that it?

K.J. Yes.

APPENDIX C.

SOME ADDITIONAL INVESTIGATIONS.

Eye Movements during Wakeful Hallucinatory States.

The studies which follow were concerned with investigation of the direction of eye movements and their relation to fantasy imagery during wakeful hallucinatory states.

1. Eye Movements during Hypnotic Dreams.

This study was carried out in conjunction with an experienced hypnotist, Dr. H. Bethune.

The EEG and electro-oculogram were recorded from a male subject who had been trained to enter a deep hypnotic trance in response to three snaps of the finger. The direction of the eye movements could be determined from the recording by the use of four independent surface-electrode pairs, the electrodes being placed supra- and infra-orbitally and at the outer and inner canthus of each eye.

A deep trance was induced and suggestions made to the effect that the subject was asleep and dreaming. Various dreams were suggested, the direction of the ensuing eye movements invariably being appropriate to the suggested dream events. When the dream, "You are standing at the side of a tennis court watching a tennis match and the players hitting the ball from one end of the court to the other during a long rally" was suggested, a series of vigorous horizontal eye movements was observed. When the dream, "You are at a swimming pool watching a high diving display at which 8 swimmers are about to dive off from the high diving board one by one, in succession, at 5-second intervals" was suggested,

16 vertical eye movements were observed, composed of 8 pairs of down-and-up movements of the eyes at 5-second intervals.

Following each dream, the subject reported (while still under hypnosis) experiencing those dream images which had been suggested to him. At no time was it suggested that he should move his eyes; but it is probable that the subject inferred that his eyes movements were being investigated from the electrode placements around his eyes.

The EEG was that of wakefulness with almost continuous alpha rhythm normally associated with the hypnotic state (Barker and Bergwin, 1948; Schwarz et al., 1955). When repetitive sleep inducing suggestions were given, flattening of the EEG trace with disappearance of alpha rhythm for a few seconds was observed, but a continuous EEG pattern of sleep was not obtained.

The above observations have since been confirmed by Schiff et al., (1961) and must be considered to support the scanning hypothesis of dream imagery. However, the hypnotic dream is not equivalent to the genuine dream of sleep, neither in respect of its underlying physiological processes nor in spontaneity of its content.

2. Eye Movements and Lysergic Acid.

The EEG and eye movements were recorded from a 24-year-old normal male volunteer one hour following intravenous injection of 100 micrograms of LSD-25 (lysergic acid diethylamide).

Vivid fantasy images are frequently experienced with the eyes closed under the influence of lysergic acid. It was hoped to record eye movements simultaneously with a continuous description by the subject of his visual imagery as he lay with eyes closed.

However, as is also frequently observed (McKellar, 1957), the subject experienced 'blockage' and became so preoccupied with his subjective experiences that he was uncommunicative and although, to judge from his occasional verbalisations, he was evidently experiencing vivid fantasy images, it was impossible to elicit a coherent description of them. Consequently, the direction of the eye movements, which were clearly displayed, could not be related to the content of such images.

Pre-frontal Leucotomy and Dreaming.

Partridge (1950) reported diminished or loss of recall of dreaming by patients following pre-frontal leucotomy.

An opportunity was taken of continuously recording the EEG and eye movements throughout one night of sleep of a female patient four weeks after pre-frontal leucotomy. She claimed not to have particularly noticed dreaming but claimed to have had at least one definite dream following the operation.

A typical cyclical EEG pattern of sleep with periods of rapid eye movements was displayed although many spikes and high voltage slow waves (post-operational) tended to obscure the EEG record.

APPENDIX D

CONDITIONS UNDER WHICH THE WORK WAS CARRIED OUT

The work was carried out independently, with the following exceptions:

1. The study of " The EEG, Eye Movements and Dreams of the Blind " was carried out jointly. About one third of the recordings and the statistical analysis of the Results were carried out by myself.
2. The study of " Melancholia and Barbiturates: A Controlled EEG, Body and Eye Movement Study of Sleep " was performed jointly. About one quarter of the recordings and the statistical analyses of the Results were carried out by myself.
3. Dr. Ian Oswald assisted in the supervision by day of subjects undergoing the 4-day period of sleep deprivation during the course of the study of " The Effects of Sleep Deprivation on Behaviour, Subsequent Sleep, and Dreaming. "
4. Dr. Ian Oswald acted as an independent judge in the studies on " The Experimental Modification of Dream Content " and " Eye Movements during Active and Passive Dreams. "
5. Assistance was received with approximately half of the recordings of the study of " The Tonus of Extrinsic Laryngeal Muscles during Sleep and Dreaming. "
6. Technical assistance was received from time to time from Mr. Norman Clark and Mr. Robert Baxter.

APPENDIX E.

COMMUNICATIONS TO LEARNED SOCIETIES.

Work described in this thesis which has already been published is included in that form.

In addition the following communications to learned societies were made:-

1. "EEG and Eye Movements and Dreams of the Blind" (jointly) at the Electroencephalographic Society Meeting, Bristol, 3rd June, 1961.
2. "Effects of Sleep Deprivation on Behaviour Subsequent Sleep and Dreaming" (jointly) at the Electroencephalographic Society Meeting, London, 6th January, 1962.
3. "Melancholia and Barbiturates: A Controlled EEG, Body and Eye Movement Study of Sleep" (jointly) at the Scottish Psychiatric Research Society Meeting, Glasgow, 20th April, 1962.
4. "The Experimental Modification of Dream Content" at the Scottish Psychiatric Research Society Meeting, Aberdeen, 5th October, 1962.